Pine Island Flatwoods Preserve

Land Management Plan

Second Edition

6351 Stringfellow Rd.
St. James City, Florida 33956

Prepared by:
The Conservation 20/20 Conservation Lands Section of
Lee County's Department of Parks and Recreation

Approved by the Lee County Board of County Commissioners:

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Acknowledgements

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List of Acronyms

ATV	All-terrain vehicle
C20/20	Conservation 20/20
CLASAC	Conservation Lands Acquisition and Stewardship Advisory Committee
DHR	Florida Department of State Division of Historical Resources
FCT	Florida Community Trust
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FGUA	Florida Governmental Utility Authority
FFS	Florida Forest Service
FLEPPC	Florida Exotic Pest Plant Council
FLU	future land use
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
IRC	Institute for Regional Conservation
LCDP	Lee County Division of Planning
LCDCD	Lee County Department of Community Development
LCEC	Lee County Electric Coop
LCPR	Lee County Parks and Recreation
LCPWD	Lee County Public Works Department
LDOT	Lee County Department of Transportation
LiDAR	Light Detecting and Ranging
LMP	Land Management Plan
LSOM	Land Stewardship Operations Manual
MU	Management Unit
ORV	Off-road Vehicle
PIFP	Pine Island Flatwoods Preserve
SFWMD	South Florida Water Management District
STRAP	Section-Township-Range-Area-Block.Lot (Parcel)
USACOE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

Vision Statement

It is the vision of the Lee County Parks and Recreation Department and the Conservation 20/20 Program to conserve, protect, and restore Pine Island Flatwoods Preserve to a productive, functional, and viable ecosystem. The primary stewardship objective for Pine Island Flatwoods Preserve will be to continue exotic plant control and a prescribed fire program which benefit the natural plant communities and listed species utilizing the site.

I. EXECUTIVE SUMMARY

Pine Island Flatwoods Preserve (PIFP) is located in western Lee County within Sections 10, 15, and 22 of Township 45 South, Range 22 East on Pine Island near St. James City. The preserve consists of STRAPs 10-45-22-00-00001.0000, 11-45-22-00-00001.0000, 15-45-22-00-00001.5000, 15-45-22-00-00001.3010, 15-45-22-00-00001.3030, and 15-45-22-00-00006.0000. The main trailhead entrance is located at 6201 Stringfellow Road.

PIFP was purchased through Lee County's Conservation 20/20 Program (C20/20). C20/20 was originally established in 1996 after Lee County voters approved a referendum that increased property taxes by up to 0.5 mil for the purpose of purchasing and protecting environmentally sensitive lands. The preserve was purchased as 8 different nominations totaling $9,251,904.00.

The preserve is separated by Stringfellow Road with the main portion of the preserve bordered by Stringfellow Road to the east, and the Bayside portion of the preserve bordered by Stringfellow Road to the west. The main preserve has mangrove swamp and mudflats to the west, a future residential development to the north, and residential homes to the south. The bayside portion of the preserve (east of Stringfellow Road) has mangrove swamp and mudflats to the east, Conservation Foundation of the Gulf Coast conservation property to the north and a privately own palm grove and residential homes to the south.

The natural elevations range from sea level along the coastline and slope in an east/west direction to 8 feet above sea level.

There are twelve different soil types found at the preserve. All of the soils within the preserve are described as nearly level and poorly drained, have severe limitations for urban uses because of the high water table and all are categorized as subject to sheet-flow or ponding.

PIFP is within the northwestern portion of the Lower West Coast Region (LWCR) of the South Florida Water Management District (SFWMD), which lies within the 1,400 square-mile Caloosahatchee Basin watershed area. The preserve lies within the South Pine Island Watershed which drains the southern half of the island from the center of the island (more or less Stringfellow Road) toward the east into Matlacha Pass and west into the Pine Island Sound.

Hydrological alterations have been made on and directly adjacent to PIFP that affect the natural sheet flow across the lands. Residential development, roads and off-site canals have drastically altered the amount and timing of water entering the preserve. The abandoned shrimp farm in the northeast corner of management unit 1 alters the natural sheetflow in this area. The ditches created in this area hold water and divert it from reaching the mangrove fringes.

PIFP contains a combination of wetland and upland communities that serve as important habitat for a variety of birds, mammals, reptiles and amphibians. The preserve consists of 14 natural or altered plant communities described by the Florida Natural Areas Inventory (FNAI). While mesic flatwoods is the most common plant community, approximately 20% of the preserve has been categorized as disturbed communities, primarily due to agriculture or hydrologic changes. Nearly 23% of PIFP is classified as wetlands. The preserve is home to 11 species which are state and/or federally listed and is thus important conservation land.

Land use history for PIFP is similar to much of the land in Lee County. Very few alterations were made on what is now the preserve, but three major disturbances occurred on the land prior to it becoming a preserve. A 19 acre citrus grove was planted along Stringfellow Road, an agricultural field was cleared of all vegetation between the 1953 and 1958 aerials, and in the mid-1960s, approximately 10 acres were cleared to create a shrimp farm.

The preserve currently offers a marked hiking trail, with a small parking area and is available for hiking, birding, nature study and photography. Future plans include an additional hiking trail on the Bayside portion as part of a partnership with the Conservation Foundation of the Gulf Coast.

The goal of this land management plan is to identify preserve resources, develop strategies to protect the resources and implement restoration activities. PIFP will continue to be restored to a productive, functional and viable ecosystem while protecting listed species and ensuring that the preserve will be managed in accordance with Lee County Parks and Recreation's Land Stewardship Operations Manual. This ten year update to the original Land Stewardship Plan is in keeping with the original conservation goals.

Restoration and management activities at PIFP will focus on controlling invasive exotic plant and animal species, protecting listed species, managing pine density, initiating and continuing burn regimes for all management units, enhancing wildlife habitat and removing debris. The Management Action Plan outlines restoration and stewardship goals. Since the original plan was written, nearly 759 acres have been treated for exotic plants, 66 acres have been replanted with native vegetation, and 250 acres have been prescribed burned. This plan outlines these goals and strategies, explains how the goals will be accomplished, and provides a timetable for completion. Any future land acquisitions to the preserve will be managed similarly to this land management plan. This plan will be revised in ten years (2026).

II. INTRODUCTION

Pine Island Flatwoods Preserve was acquired in eight parcels though Lee County's Conservation 20/20 Program beginning in 2000 and continuing in 2001, 2002, 2003, 2005, and most recently in 2008. The total acquisition cost was

$9,251,904 and totals 919.64 acres in size. Located on Pine Island, with the main trailhead entrance at 6201 Stringfellow Road, the site lies approximately halfway between Pine Island Center and St. James City. The preserve is split by Stringfellow Road with 189.9 acres located on the east side of Stringfellow Road, referred to later in the plan as the Bayside portion (management units 14 and 15), with the remaining 729.74 acres on the west side of the road.

The preserve contains a variety of native plant communities including pine flatwoods, mangrove swamp, hydric hammock, improved pastures, and abandoned citrus groves. A majority of these communities exist in soils that are hydric in nature and composed of a large percentage of Myakka Fine Sand. A unique feature to the preserve is a large complex of pine flatwoods that include the longleaf pine (*Pinus palustris*), a tree species which was almost entirely removed by logging in the early 1900s. Additional historical activities at the preserve's main parcel include a citrus grove prior to 1944, a shrimp farm in the mid 1960s, land clearing for pastures in the 1980s, and a large array of treated effluent water release sprinklers installed by Lee County Utilities in the late 1990s. Overall, the current state of the preserve is relatively healthy and managed to provide high quality habitat for plant and animal communities native to Pine Island.

Land management will involve bi-annual herbicide treatments for exotic plants as needed and conducting prescribed burns every 2-5 years to maintain the openness and promote diversity within the pine flatwoods ecosystem. These management strategies will also serve to benefit the threatened and protected species which have been documented at the preserve and highlighted in later sections.

Conservation 20/20 staff are currently working on a restoration plan for the Bayside portion which consists of management units 14 and 15. Management unit 14, which is currently improved pasture and a disturbed wetland in management unit 15. The cattle lease is expiring in September 2016, at which time the pasture restoration project consisting of native species plantings, and continuous monitoring of the ecosystem with an ultimate goal of transitioning the site into a natural wetland ecosystem. The wetland restoration work will begin after the pasture restoration is completed.

The purpose of this Land Management Plan is to define conservation goals for Pine Island Flatwoods Preserve that will address the above goals and concerns. It will serve as a guide for Lee County's Department of Parks and Recreation to use best management practices to ensure proper management and protection of the preserve. It also can be used as a reference guide since a significant amount of field surveys were conducted along with researching scientific literature, studies, and historical records to understand how the preserve functions in the ecosystem with the wildlife and plants found within its boundaries as well as influences from human use.

III. LOCATION AND SITE DESCRIPTION

Pine Island Flatwoods Preserve is located at 6201 Stringfellow Rd. and 7630 Stringfellow Rd. on Pine Island in western Lee County, within Sections 10, 11, 15, 21, 22, and 23 of Township 45 South, Range 22 East. The site totals nearly 920 acres and is made up of eight separate acquisitions purchased in 2000, 2001, 2002, 2003, 2005, and 2011. The preserve parcels are separated by Stringfellow Road with the main portion of the preserve bordered by Stringfellow Road to the east, and the Bayside portion of the preserve bordered by Stringfellow Road to the west. The main preserve parcels have mangrove swamp and mudflats to the west, a future residential development to the north, and residential homes to the south. The Bayside portion of the preserve has mangrove swamp and mudflats to the east, Conservation Foundation of the Gulf Coast (CFGC) conservation property to the north and a privately owned palm grove and residential homes to the south (Figures 1 and 2).

The preserve consists of 14 native plant communities, including mesic pine flatwoods, freshwater marshes, tidal swamp, hydric hammock, coastal grassland, coastal berm, improved pastures, abandoned groves, and unconsolidated substrate. These community designations are based on Florida Natural Areas Inventory's Guide to the Natural Communities of Florida (2010) and the Florida Land Use Cover and Forms Classification System (FLUCCS) (FDOT 1999). Dominant areas are mesic and wet flatwoods and freshwater marshes. Approximately 16% of the plant communities are designated as "disturbed," typically due to land clearing activities, lack of fire, invasive exotic plant infestations and/or changes in the natural drainage patterns. Figure 1 shows PIFP's location in Lee County while Figure 2 identifies the current boundaries of PIFP in a 2016 aerial photograph.

Figure 1: Location Map

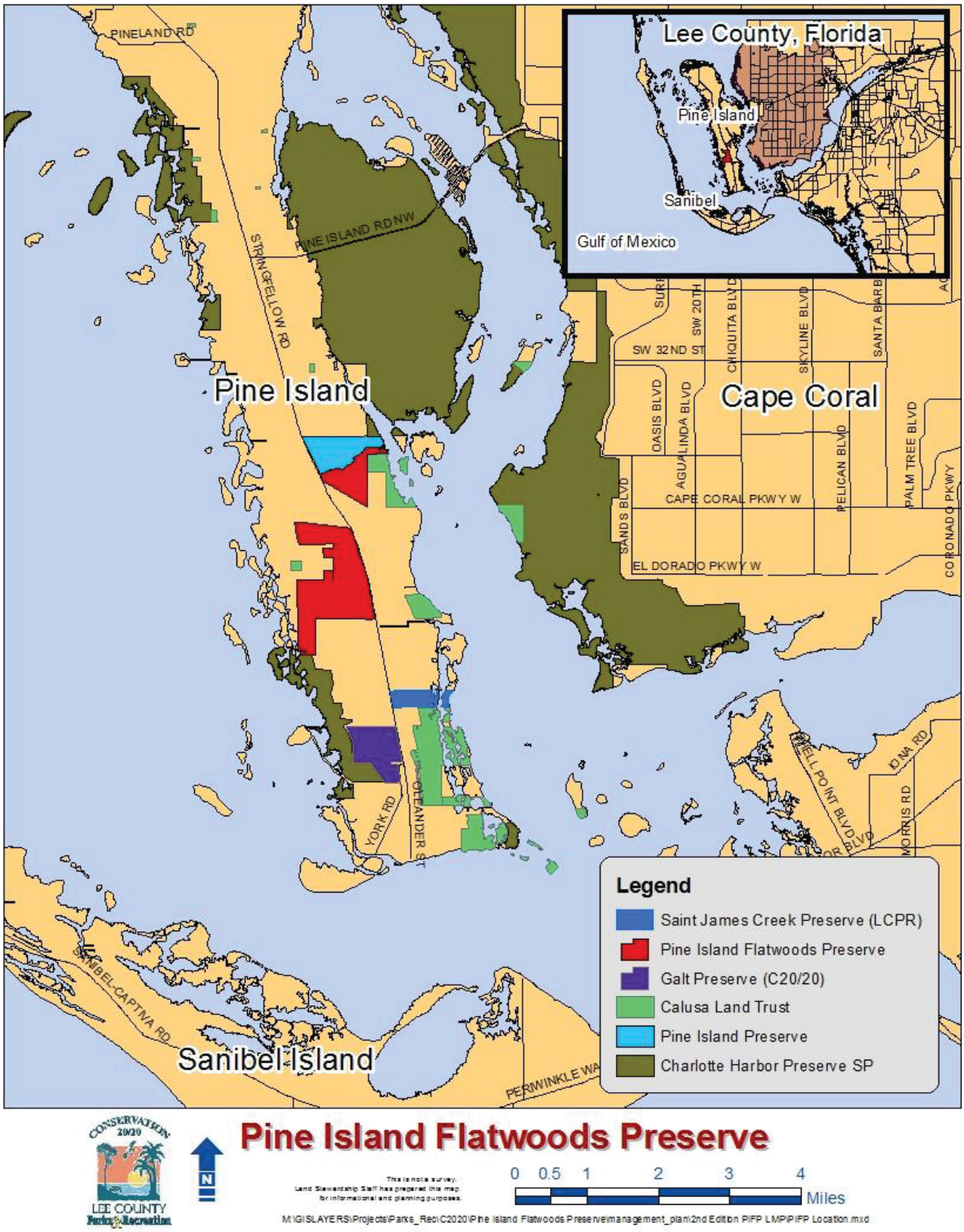
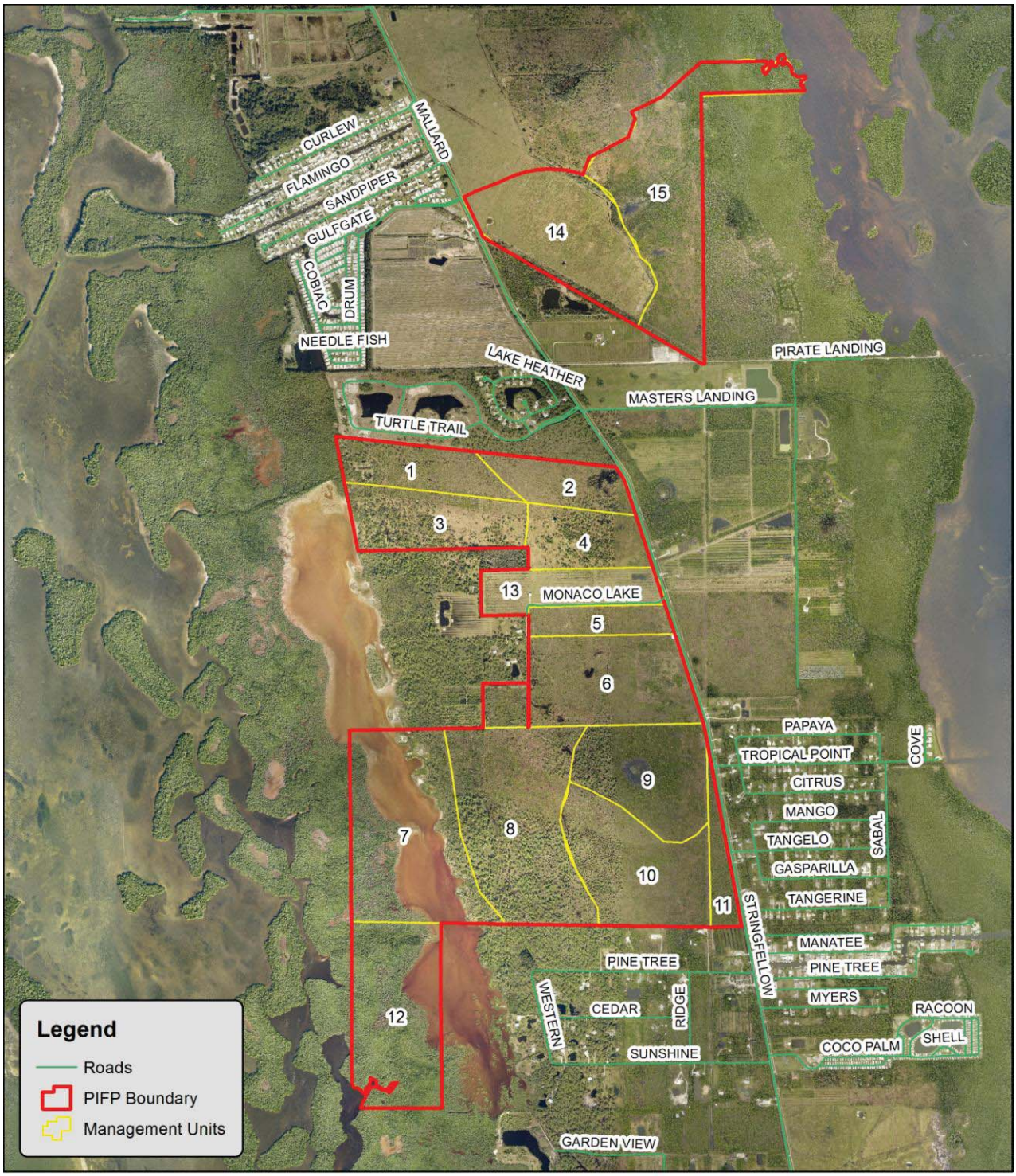


Figure 2: 2016 Aerial Map



IV. NATURAL RESOURCES DESCRIPTION

A. Physical Resources

i. Climate

General information on the climate of southwest Florida is located in the Land Stewardship Operations Manual's (LSOM) Land Stewardship Plan Development and Supplemental Information section.

ii. Geology

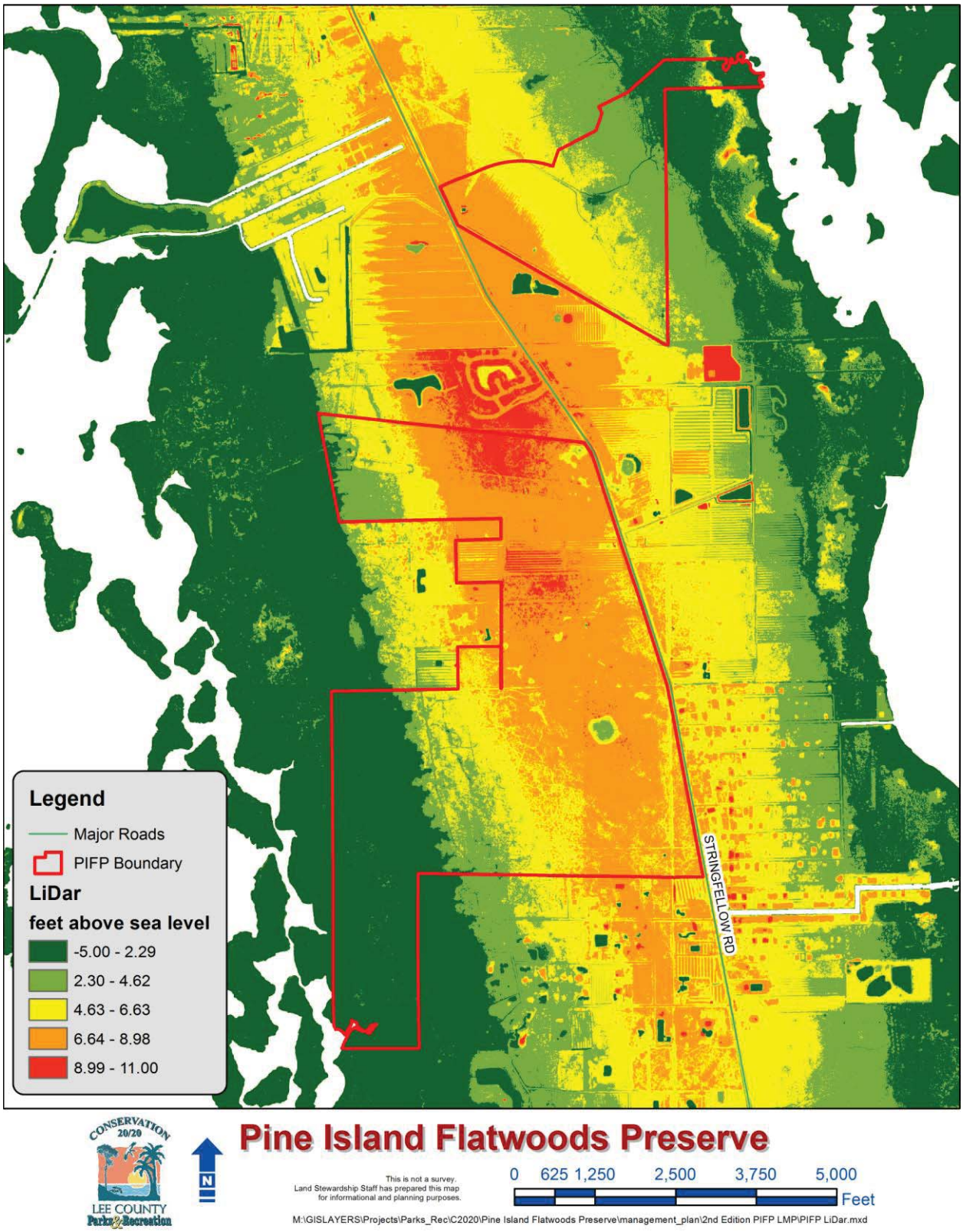
Specific information on the geologic features such as physiographic regions, formations and maps can be found in the LSOM's Land Stewardship Plan Development and Supplemental Information section.

iii. Topography

Natural elevations at PIFP range from sea level along the coastline of the preserve to 8 feet above sea level along the center of the preserve. Man-made features at PIFP include ditches and cow wells associated with agricultural activities, a cleared former palm grove which is transitioning with plantings to pine flatwoods, and a couple of old ponds that may have been created for shrimp farming. These features and impacts will be discussed more thoroughly in the Hydrology and Watershed section of this plan. Exterior topographic features include Stringfellow Road that runs down the middle of the island and separates the main portion of the preserve from the Bayside portion.

The following topographic map (Figure 3) uses light detecting and ranging (LiDAR) data, which is an optical remote sensing technology that measures properties of scattered light to find range and/or other information of a distant target. The LiDAR was flown in 2007 and represents the published 5 foot digital elevation model. The change in color gradient visually demonstrates the change in elevation from the higher north end of the preserve to lower elevations in the southern end.

Figure 3: LiDAR Map

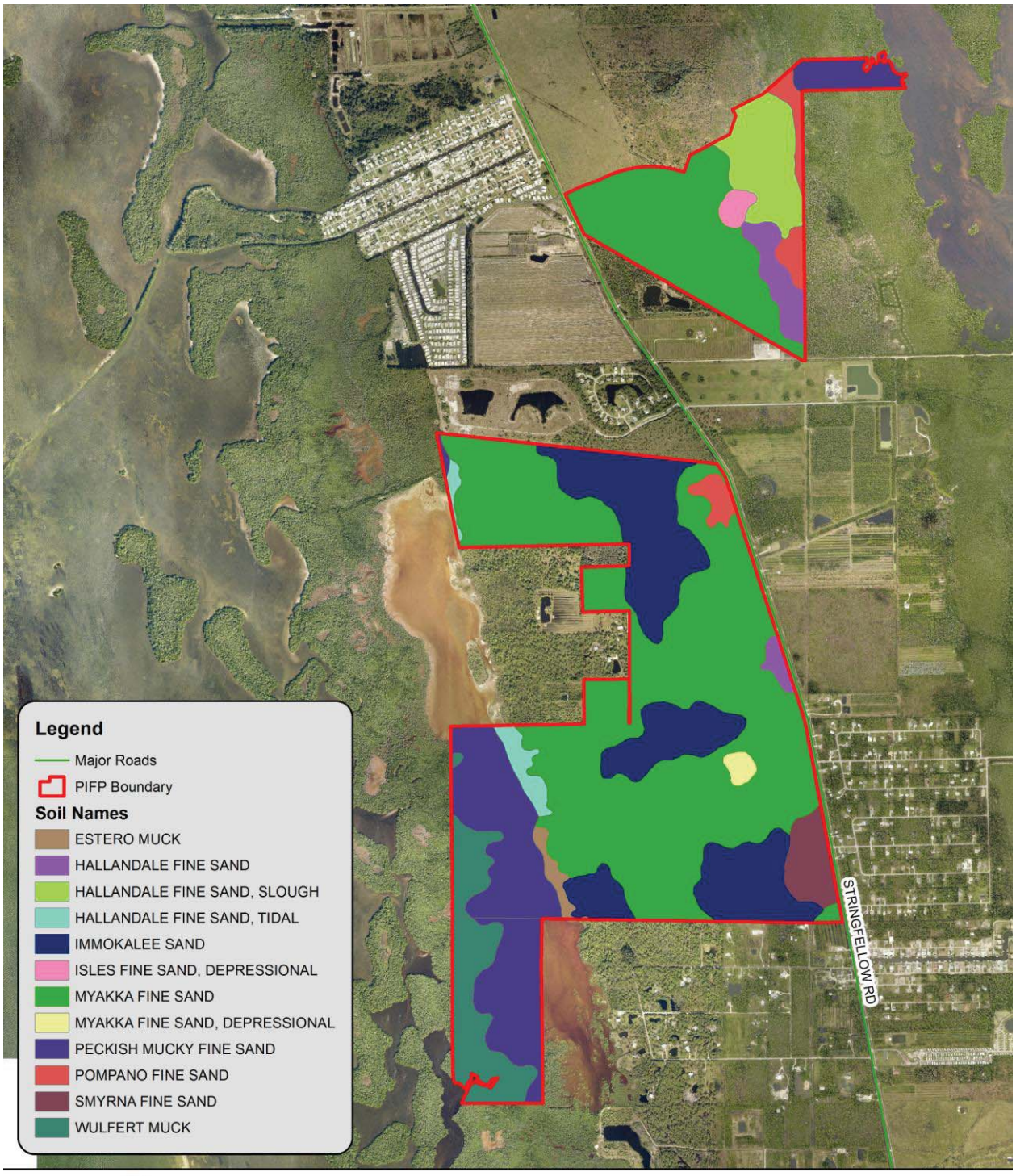


iv. Soils

PIFP contains a total of 12 different soils (Appendix A and Figure 4). All of the soils are described as nearly level and poorly drained, with severe limitations for urban uses because of the high water table. Soils play an important role in dictating the location and types of recreation that the preserve can provide.

Refer to the LSOM's Land Stewardship Plan Development and Supplemental Information section for additional information on soil types and limitation.

Figure 4: Soils Map



v. Hydrologic Components and Watershed

PIFP is within the northwestern portion of the Lower West Coast Region of the South Florida Water Management District, which lies within the 1,400 square-mile Caloosahatchee Basin watershed area (SFWMDa 2000) as seen in Figure 5. Despite only reaching 16 miles in length and 3 miles wide, Pine Island is further divided into a 21 square-mile north and 28 square-mile south watershed with the dividing line placed at the east-west corridor of Pine Island Road. The preserve lies within the South Pine Island Watershed which drains the southern half of the island from the center of the island (more or less Stringfellow Road) toward the east into Matlacha Pass and west into the Pine Island Sound.

The preserve is divided by Stringfellow Road and surrounded by residential or conservation properties. The water flow over the property has historically been sheetflow but was modified through construction of roads and ditches, the shrimp farm ponds, agricultural drainage ditches, and clearing of pasture land. The shrimp ponds, which are surrounded by spoil piles, divert natural sheet flow. Additionally, in MU 3 and 4, there are treated effluent water release sprinklers that are managed by Lee County Utilities.

The largest restoration project is planned for the newest acquisition, parcel 389 (Bayside), in management units 14 and 15. This parcel has experienced a large amount of water flow disturbances including agricultural drainage ditching, pasture clearing, cattle grazing, installation of an irrigation pump, soil disturbances by ORVs, and cultivation of an invasive exotic plant monoculture. These disturbances caused the current water flow to either accumulate in a basin created by intersecting drainage ditches that transect the site or drain into the Lee County Department of Transportation ditch that runs along the southern boundary. The site also has a cattle well that holds water year-round and has minimal impact on the overall water flow. The restoration plan for this site will include back-filling the inactive ditches or constructing ditch plugs, removing invasive exotic plants, planting native plants, and reconstructing natural wetland and flatwoods communities to restore historic sheetflow to the site.

All restoration projects on the preserve will be carefully planned so as to enhance natural communities and to work with the public amenities that have been created. Hydrologic projects that negatively affect the natural communities, listed species or public amenities, such as designated trails will not be undertaken.

Natural communities on the preserve have been identified utilizing the National Wetlands Inventory (NWI), created by the United States Fish and Wildlife Service (USFWS) Office of Biological Services. The NWI uses aerial photography to identify natural wetland communities by vegetation, visible water features and geography, and subsequently classified in general accordance with the Classification of Wetlands and Deep Water Habitats of the United States (Cowardin et al. 1979). More information about the different classifications can be found there, or in the LSOM: Land Stewardship Plan Development and

Supplemental Information section. NWI findings for PIFP can be found in Figure 7.

Figure 5: SFWMD Watershed Map

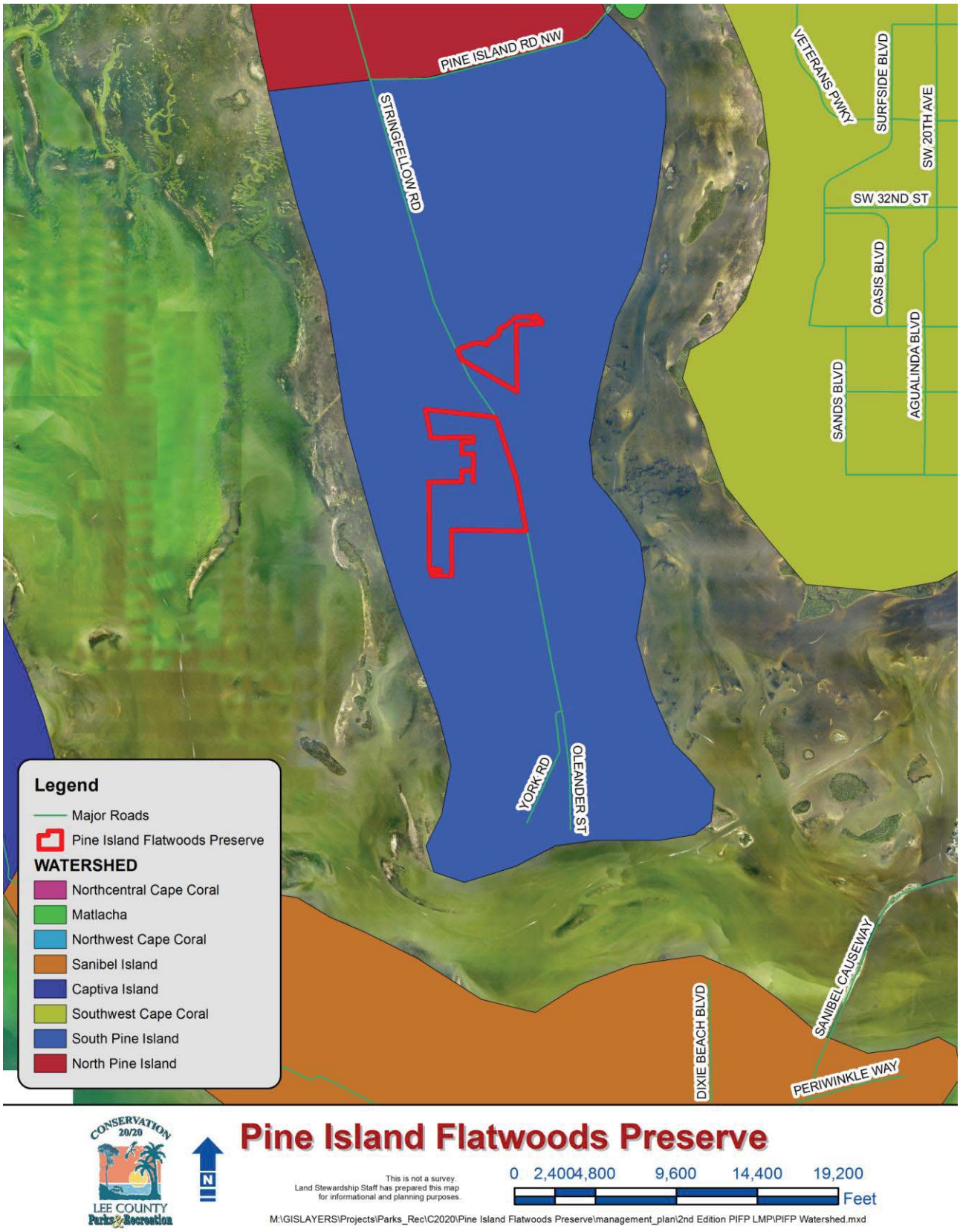


Figure 6: LCDNR Watershed Map

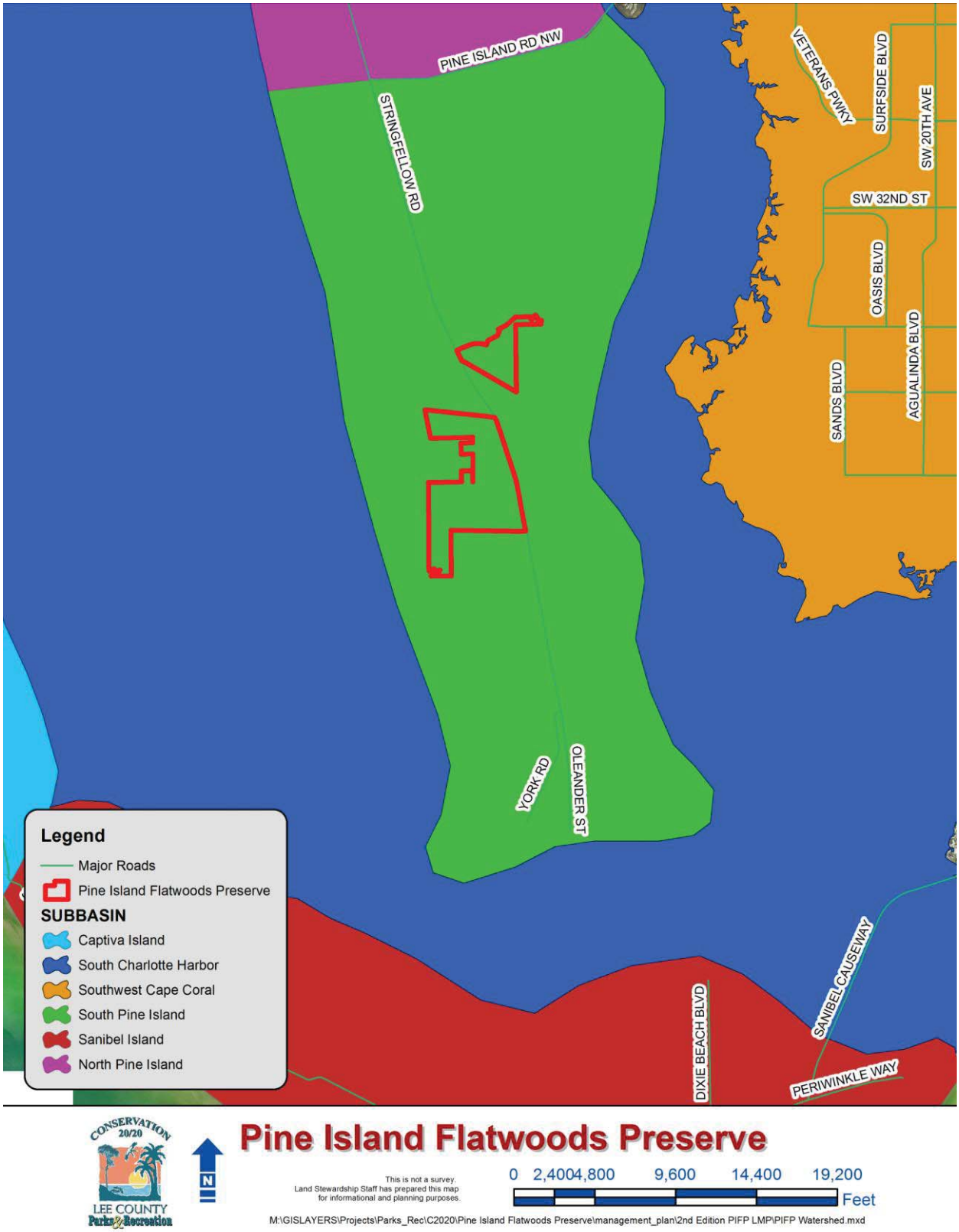
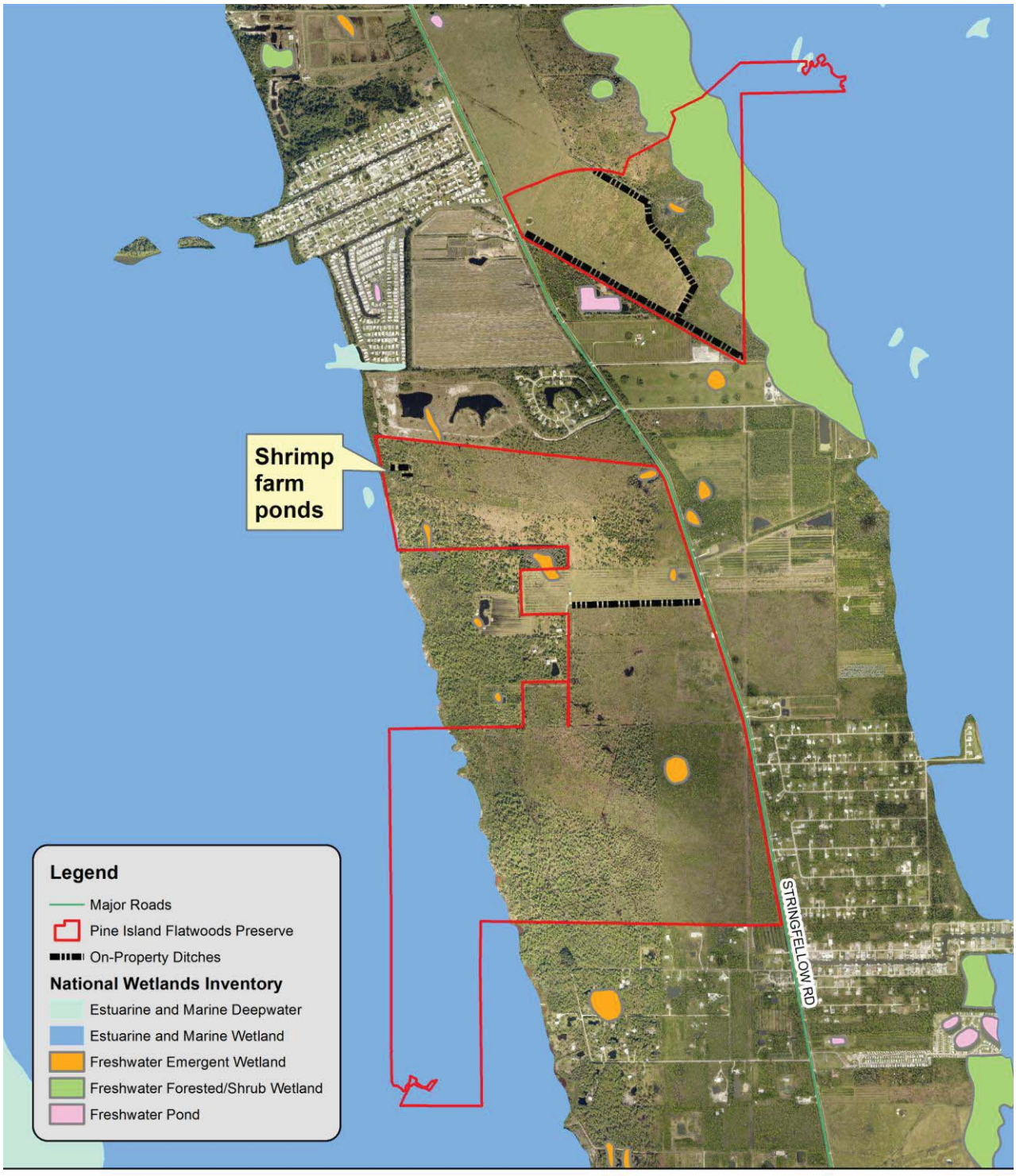


Figure 7: Hydrologic Features Map



B. Biological Resources

i. Ecosystem Function

Lee County's preserves contain a diversity of plant communities that provide habitat for numerous plant and animal species. The majority of the preserves are not islands of habitat, but are pieces of a larger conservation effort striving to create or maintain a healthy and viable ecosystem.

Pine flatwoods provide essential cover and forage material for a variety of birds, large and small mammals, amphibians and reptiles including gopher tortoise (*Gopherus polyphemus*), eastern indigo snake (*Drymarchon coraiscouperi*) and Florida black bear (*Ursus americanus floridanus*). Birds find shelter in the palmetto understory, nest in the tall pines and forage in the grasses. Oak toads (*Anaxyrus quercicus*) will dig burrows in the sandy soil and hunt for spiders and insects. There are a number of rare wildlife species that primarily occur in the flatwoods as well as numerous rare plants, including some endemic species. During the wet season, these communities provide dry refuge for non-aquatic animals. During a severe flood, the flatwoods serve as a water storage area to help protect adjacent land from flooding (Tiner 1998). Hydric pine flatwoods function seasonally as both a wetland and upland. This hydrologic transformation allows for an abundant diversity of flora, which in turn, supports a wide range of wildlife (USFWS 1999).

Fire is an important natural component of pine flatwoods. Florida has more thunderstorm days per year than anywhere else in the country and, in turn, one of the highest frequencies of lightning strikes of any region in the United States. Fire shapes ecosystem processes in the flatwoods including: creation of soil conditions suitable for germination of seeds of some species, turnover of litter, humus and nutrients, reduction of competition from hardwoods and increasing the hardiness of some species (Myers and Ewel 1990). Mechanical thinning and rollerchopping of pine flatwoods is beneficial, especially in areas that have suffered fire suppression or have had hydrologic alterations to surrounding lands which can create conditions favoring growth of pines over hardwood species. Without regular fire or mechanical work, pine flatwoods can become dense stands of palmetto and have tall weak pines which block sunlight from reaching the ground. This can further decrease the biodiversity and coverage of native grasses and wildflowers that gopher tortoises, quail and many other species depend upon. Mechanical reduction of vegetation is also important for converting overgrown abandoned agricultural fields to more natural and dynamic plant communities. However, mechanical reduction of vegetation cannot fully replace prescribed fire for long-term maintenance of pine flatwoods communities.

There are numerous isolated herbaceous wetlands scattered throughout the preserve. The freshwater wetlands of south Florida are important to a variety of wildlife and people. Birds feed, fish and frogs live and breed, and people rely on these marshes to improve water quality and recharge the aquifers. Seasonal

changes profoundly affect the hydrological conditions of preserve areas. During the late spring and summer months, the rain begins to fall and the wetlands fill to capacity. Fish populations begin to increase both in number and biomass. In the fall when the consistent rains end, the water recedes and the fish are concentrated in the shallow marshes. The wading birds then come in to feast, which aids the remaining fish by decreasing the density and increasing the availability of dissolved oxygen. Most wildlife utilizing these communities have adapted by migrating from one wetland to another as the shallow ones dry up.

The depression marshes are also important to some species of wading birds for their nesting success. For example, the white ibis (*Eudocimus albus*) chooses nesting sites near marshes that have appropriate drying conditions. Some herons and wood storks also need specific dropping water levels over a prolonged four-month nesting season. The faster the marsh dries, the sooner nesting starts. If the water level rises, then nesting success declines (Myers and Ewel 1990).

This drying period is not only important to the fauna but also to the flora. Plants in these areas also benefit from the seasonal wet/dry fluctuations. The wetland plants become completely dry, die, decay, and release nutrients. Typically, these plants have low nutrient requirements so they stockpile the excess, which is beneficial to herbivores feeding upon them. Most aquatic plants cannot germinate under water and require a drying phase.

ii. Natural Plant Communities

The preserve contains a combination of wetland and upland communities that serve as important habitat for a variety of birds, mammals, reptiles and amphibians. Pine Island Flatwoods Preserve consists of 14 plant communities described by the Florida Natural Areas Inventory. Figure 8 illustrates the location of each community within the Preserve. The natural communities found at PIFP are defined using the Florida Natural Area's Guide to the Natural Communities of Florida (2010). Appendix C contains an up-to-date list of plant species identified by Dr. George Wilder and Land Stewardship staff on numerous site inspections to PIFP, but not necessarily a comprehensive list for the entire preserve.

Acreages and percent of cover for each community are listed below. Descriptions of the plant communities and characteristic animals found within each community, as well as management suggestions can be found in the LSOM. The percent cover is slightly under 100% due to rounding off values. A complete list of plant species identified during site inspections to PIFP can be found in Appendix C. Nearly all of these plant communities were inundated with exotic species, primarily Melaleuca, when the first edition of this plan was written. Since that time, all exotic plant monocultures and scattered plants on the preserve have been treated and monocultures have been eliminated. These plant communities represent the current state of the preserve with native plants taking over.

Mesic Flatwoods – 449.20 acres, 49% coverage at PIFP

Mesic Flatwoods - **Disturbed**– 89.40 acres, 10% coverage at PIFP

Mangrove Swamp – 131.29 acres, 14% coverage of PIFP

Unconsolidated Substrate – 51.54 acres, 6% coverage of PIFP

Hydric Hammock – 11.39 acres, 1% coverage of PIFP

Depression Marsh – 7.3 acres, <1% coverage of PIFP

Salt Flat – 6.13 acres, <1% coverage of PIFP

Salt Marsh – **Disturbed** – 10.28 acres, 1% of PIFP

Altered Land Types

Spoil Area – 3.62 acres, <1% coverage of PIFP

Developed – 0.14 acres, <1% coverage of PIFP

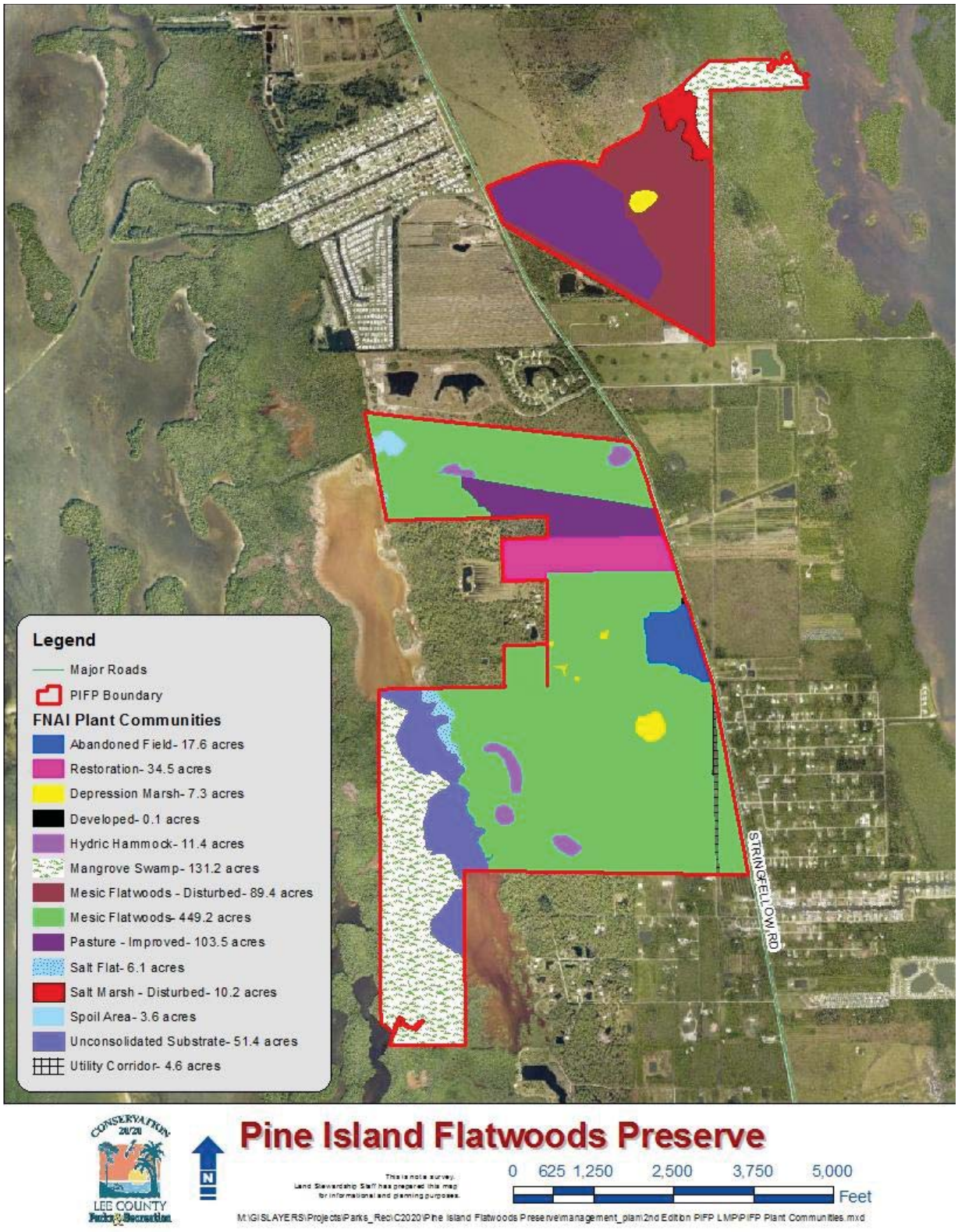
Utility Corridor – 4.68 acres, <1% coverage of PIFP

Restoration – 34.52 acres, 4% coverage of PIFP (former palm grove)

Pasture- Improved – 103.58 acres, 11% coverage at PIFP

Abandoned field (FLUCCS 224) – 17.67 acres, 2% coverage of PIFP

Figure 8: Plant Communities Map



iii. Fauna

Pine Island Flatwoods Preserve provides a variety of habitats for a diversity of wildlife. Some permanently reside at the preserve, while others occur seasonally or sporadically. Appendix B contains a listing of all wildlife documented to date at the preserve through numerous site inspections and by Lee County Bird Patrol volunteers. Future sightings will continue to be recorded and will be included in the next edition of this plan.

There are also several exotic wildlife species that have been documented at PIFP (Table 1). A species of primary concern is the feral hog (*Sus scrofa*) due to the level of damage to vegetation and soil disturbances immediately apparent in the understory of the hydric hammock plant community caused by their rooting up the ground in search of food. Management for feral hogs includes trapping and hunting by permitted contractors.

Table 1 Exotic Fauna at PIFP

Scientific Name	**Common Name**
Eleutherodactylus planirostris planirostris	greenhouse frog
Osteopilus septentrionalis	Cuban treefrog
Anolis sagrei	brown anole
Sus scrofa	feral hog
Dasypus novemcinctus	nine-banded armadillo

Wildlife management at PIFP focuses on providing optimal habitat for native species and will achieve this goal by removing invasive exotic plants and animals, such as the feral hog. Land managers will also focus on application of prescribed fire and elimination of ORVs, except when absolutely necessary for stewardship activities, as critical restoration components.

New plant or animal species, and impacts or changes to the preserve are documented during countywide tri-annual site inspections at all Conservation 20/20 Preserves. If, during inspections staff observes a new FNAI listed species, the observation will be reported using the appropriate forms and will be reflected in the next edition of the LMP as well as the annually updated wildlife lists for the preserve, which can be found on the Conservation 20/20 website.

iv. Designated Species

There are a variety of designated animal and plant species found at PIFP. Although all native plant and animal species found on the preserve have some protection due to the preservation of this property, certain species need additional attention. For management purposes, all plants and animals listed by the USFWS, Florida Fish and Wildlife Conservation Commission (FWC), Florida Department of Agriculture and Consumer Services (FDACS), the Institute for Regional Conservation (IRC) and FNAI will be given special consideration when considering recreation and hydrological projects.

The following are brief summaries of designated wildlife species and reasons for their decline. Unless stated otherwise, the reasons for the species' decline and the management recommendations, if available, were obtained from Hipes et al. (2001).

Gopher Tortoise

Gopher tortoises are in decline throughout their range due to loss and degradation of habitat. As a species dependant on dry, upland communities, much of their habitat has been lost to urban and residential development, agriculture, citrus groves, mining, and pine plantations. Additional threats include a highly contagious respiratory disease and human consumption.
Although no formal census has been conducted on the entirety of PIFP, they have been confirmed on the preserve in various locations, and a formal burrow survey was conducted on a small portion of the preserve as part of an FWC gopher tortoise habitat improvement grant. Exotic plant removal and prescribed burning will benefit this species. Before restoration activities that utilize heavy equipment take place, land management staff will conduct burrow surveys in areas where tortoise burrows could be present. The areas will be flagged and the equipment operators will be advised to stay outside of the areas.

Eastern Indigo Snake

The eastern indigo snake is a large, iridescent black snake with a red, coral, or white throat (record length, 8.6 feet). This species is found in a large spectrum of plant communities throughout Florida and southern Georgia and is often associated with gopher tortoise burrows. The eastern indigo is threatened throughout its range due to habitat loss, degradation and fragmentation. Although it is now illegal to possess this animal without the proper permits, the pet trade is another cause for decline of this species. The most common direct causes of mortality are human caused, either by people afraid of snakes or accidental highway mortality. The indigo snake utilizes a home range of approximately 125-250 acres, and the males are territorial during the breeding season. The indigo snake feeds diurnally on reptiles, amphibians, birds, and small mammals, primarily around the edge of wetlands. The eastern indigo snake breeds from November through April, then lays 5-10 eggs in May or June (USFWS 1982).

The eastern indigo snake has been confirmed utilizing PIFP near the depressional marsh in MU 9. Public education about the ecological value of this and other species of snakes will help to protect them from visitors to the preserve and from adjacent landowners.

Magnificent Frigatebird

The magnificent frigatebird's (*Fregata magnificens*) population isn't easily estimated. These birds are found along ocean coastlines and are often found flying out far from land. This species typically visits Florida but seldom nests here.

Brown Pelican

The brown pelican (*Pelecanus occidentalis*) population was decimated in the 1950s and 60s due to the use of the pesticide DDT (dichlorodiphenyltrichloroethane). Populations have since risen, but they still face other threats such as increased turbidity from dredging, oil and other chemical spills, freezing weather, human disturbance and entanglement in fishing gear.

Protecting foraging and breeding areas are the management recommendations for this species.

Little Blue Heron, Tricolored Heron, Great Egret, Snowy Egret and Reddish Egret

The little blue heron (*Egretta caerulea*) and tricolored heron (*E. tricolor*) population decline are due to loss of freshwater wetlands and alteration of natural hydroperiods. There is also some indication that pesticides and heavy metal contamination may affect these herons. Like these herons, the great egret (*Ardea alba*) and the snowy egret (*E. thula*) population has been declining throughout its range since the 1950s. Scientists believe that the main reason for this decline is the loss and alteration of wetlands where they forage. The reddish egret (*Egretta rufescens*) is the rarest heron due to poaching by plume hunters in the early 1900s and continued habitat loss. PIFP habitats offer nesting and forage areas for these species.

White Ibis, Glossy Ibis and Roseate Spoonbill

Similar to the herons listed above, the white and glossy ibis (*Plegadis falcinellus*) and roseate spoonbills (*Platalea ajaja*) are declining throughout their range due to the reduction and degradation of wetlands, and human disturbances to their rookeries. The wetlands on PIFP provide foraging opportunities.

Wood Stork

Wood storks (*Mycteria americana*) are very sensitive to water levels in freshwater wetlands, as they require high concentrations of fish in fairly shallow water for foraging. Unnaturally high water levels during nesting seasons and extended droughts are both threats that wood storks face. PIFP provides forage areas for storks throughout the year.

Osprey

The osprey is found on or near rivers, large lakes and coastal areas where nesting sites are suitable. Ospreys have been confirmed feeding and perching, but not nesting at PIFP. They face many threats, including boat traffic disturbance and limited food availability. Snags will be left standing near wetland areas and the salt flats to provide nesting opportunities at PIFP.

Swallow-tailed Kite

Swallow-tailed kites (*Elanoides forficatus*) migrate to southwest Florida from South America in late February/early March for their nesting season that lasts

through late July/early September. In the early 1900s, swallow-tailed kites were confirmed as nesters in 21 states, but today are only found in seven southeastern states. Habitat loss of nesting sites through development and conversion to agriculture are the major threats to this species. Maintaining a mix of open and dense stands of trees on PIFP will offer nesting opportunities.

Short-tailed Hawk

The short-tailed hawk's (*Buteo brachyurus)* Florida population is very small, with about 400 birds concentrated mainly in the southern part of the state. Although this species is found in other tropical lowlands, Florida's population has probably been isolated for hundreds or even thousands of years. Effects of loss of habitat to urbanization and deforestation are poorly known, but studies suggest that development poses a threat. Florida rehabilitators have treated birds for gunshot wounds and collisions with cars. Nesting habitat has been lost to cypress logging as these birds appear to have high fidelity to their breeding sites. Short-tailed hawks feed on small birds which are plentiful at PIFP during winter months.

Bald Eagle

Bald eagle numbers have steadily increased in Florida after a low of 120 active nests in 1973. Loss of habitat and human disturbance due to development is still a primary concern for this species. During recent nesting seasons there have been two active eagle nests on the preserve in MU 3.
Staff will monitor any nesting activities from a distance. Additionally, bird patrol volunteers assigned to the preserve are always on the lookout for nesting activities and report their findings to staff and Lee County's Eagle Technical Advisory Committee (ETAC). If nests at PIFP are active, no mechanical or hand crew work will take place within 660 feet of the nest during nesting season.

Merlin

The merlin (*Falco columbarius*) population in the United States has shifted northward leaving fewer merlins in Florida. The merlin was impacted by pesticides such as DDT during the 1960s and 1970s which caused eggshell thinning and brood failure. They are also subject to habitat destruction by humans. Merlins feed on shorebirds along the coastline. The salt flats at PIFP provide great foraging opportunities.

Hairy Woodpecker

The hairy woodpecker (*Picoides villosus*) is thought to have declined from historic levels due to loss of nesting sites as well as increased nesting site competition with house sparrows (*Passer domesticus*) and starlings (*Sturnidae*). Snags will be left in management units whenever possible to provide forage and nesting opportunities.

Plant Species

Northern Needleleaf, Giant and Cardinal Airplants

The northern needleleaf (*Tillandsia balbisiana*) is a threatened species listed by FDACS that is occasionally found in a variety of habitats including pinelands, hammocks and mangroves. Cardinal airplant or stiff-leaved wild pine (*T. fasciculata* var. *densispica*) is an endangered species listed by FDACS. Giant airplant or giant wild-pine (*T. utriculata*) is a bromeliad considered to have been quite common in Florida before the arrival of the Mexican bromeliad weevil (*Metamasius callizana*) and is now also listed as endangered by FDACS. These bromeliads have been documented throughout tidal swamp and hammock areas of the preserve. Threats to these bromeliads include illegal collecting, the exotic Mexican bromeliad weevil and habitat destruction (Save 2004).

Golden Leather Fern

Golden leather fern (*Acrostichum aureum*) is listed as threatened by the FDACS. It is found in mangrove swamps, saltwater and brackish marshes and coastal hammocks. It's range is restricted to the southern coastal regions of Florida. It has been documented in several portions of PIFP. In some areas of the preserve, this plant is found growing among exotic plant species. During exotic plant removal or other restoration activities, staff will survey these areas before work commences to avoid using heavy equipment and only use hand crews.

IRC, which is not a regulatory agency, also maintains a listing of threatened plant species. IRC's designation is either obtained from their book Rare Plants of South Florida: Their History, Conservation and Restoration, (Gann 2002) or through their internet website: www.regionalconservation.org. Scientists working for this institute have conducted a tremendous amount of field work and research documenting plants occurring in conservation areas throughout Florida's 10 southernmost counties.

This initial floristic inventory allowed the IRC to rank plant species in order to indicate how rare/common these plants are in protected areas. Rare plants are defined as being either very rare and local throughout their range in south Florida (21-100 occurrences, or less than 10,000 individuals), or found locally in a restricted range. IRC only ranks those taxa as rare when there are fewer than 100,000 individuals. Imperiled plants are those that are imperiled in south Florida because of rarity (6-20 occurrences, or less than 3,000 individuals) or because of vulnerability to extinction. This can be due to some natural or human factors. IRC only ranks taxa as imperiled if there are fewer than 10,000 individuals. Critically Imperiled plants are defined as being either extremely rare (5 or fewer occurrences, or fewer than 1,000 individuals), or extremely vulnerable to extinction from natural or human factors. IRC only ranks those taxa as critically imperiled with 10,000 or fewer individuals.

Gann (2002) provides an entire chapter of recommendations to help restore south Florida's rare plant diversity. Several of these recommendations, particularly those that protect plants on the preserves and relate to management practices, will be followed. More information on the specific techniques used will be discussed in the Management Action Plan. The following list highlights IRC recommendations that will be incorporated into the management of PIFP:

- Prohibit recreational activities such as off-road vehicle use to avoid impacts to rare plant populations.
- Prevent illegal poaching of rare plants.
- Prosecute poachers to the fullest extent of the law.
- Implement an ongoing exotic pest plant control program.
- Educate exotic plant control crews about the rare plants to ensure they avoid non-target damage.
- Trap feral hogs, which can completely destroy the above ground vegetation and disturb all the soil in an area where they are feeding.
- Initiate prescribed fire regimes in communities that are fire adapted since fire as a management tool is extremely critical for the protection of many rare plants.
- Divide the site so the entire area is not burned during the same year to help protect these communities.
- Ensure that management activities do not negatively impact rare plant populations.

v. Biological Diversity

General information on biological diversity and measures used to help promote biological diversity can be found in the LSOM's Land Stewardship Plan Development and Supplemental Information section.

The integrity and diversity of each C20/20 preserve must be protected when and where possible. Where applicable and practical, staff will perform the following actions in this regard:

- Control of invasive, exotic vegetation followed by regular maintenance to provide more suitable habitat for native aquatic and terrestrial species.
- Control invasive exotic animal populations to reduce their impacts on the herbaceous plants, native animals and soils.

- Maintain boundary signs to deter illegal access to the preserve and protect fragile ecosystems. Continue to monitor the site for illegal ORV use and install fencing or other barriers if necessary.

- Install and maintain “no berry picking” signs to inform palmetto pickers it is illegal to harvest them on the preserves.

- Implement a prescribed fire/mechanical fuels management program to closely mimic the natural fire regimes for different plant communities to increase plant diversity and ensure the canopies remain open in the appropriate plant communities.

- Where necessary, install perimeter fire breaks to protect resources on the preserve and surrounding neighbors in the event of wildfires.

- Remove any debris and prevent future dumping within the boundary line.

- Conduct on-going species surveys utilizing volunteers and staff to catalog and monitor the diversity that is present.

- Reduce canopy cover in appropriate plant communities to promote herbaceous plant diversity.

- Use adaptive management if monitoring of restoration techniques indicates a change may be necessary.

- Offer public access that allows citizens to enjoy the preserve while protecting sensitive plant communities and wildlife needs.

- Enhance hydrologic conditions with the goal of restoring as close to historic hydroperiods as current surrounding land use allows while protecting current upland communities.

- Prevent and prosecute poaching and removal activities (e.g. palmetto berry harvesting, illegal hunting, pine cone/straw removal and orchid collection).

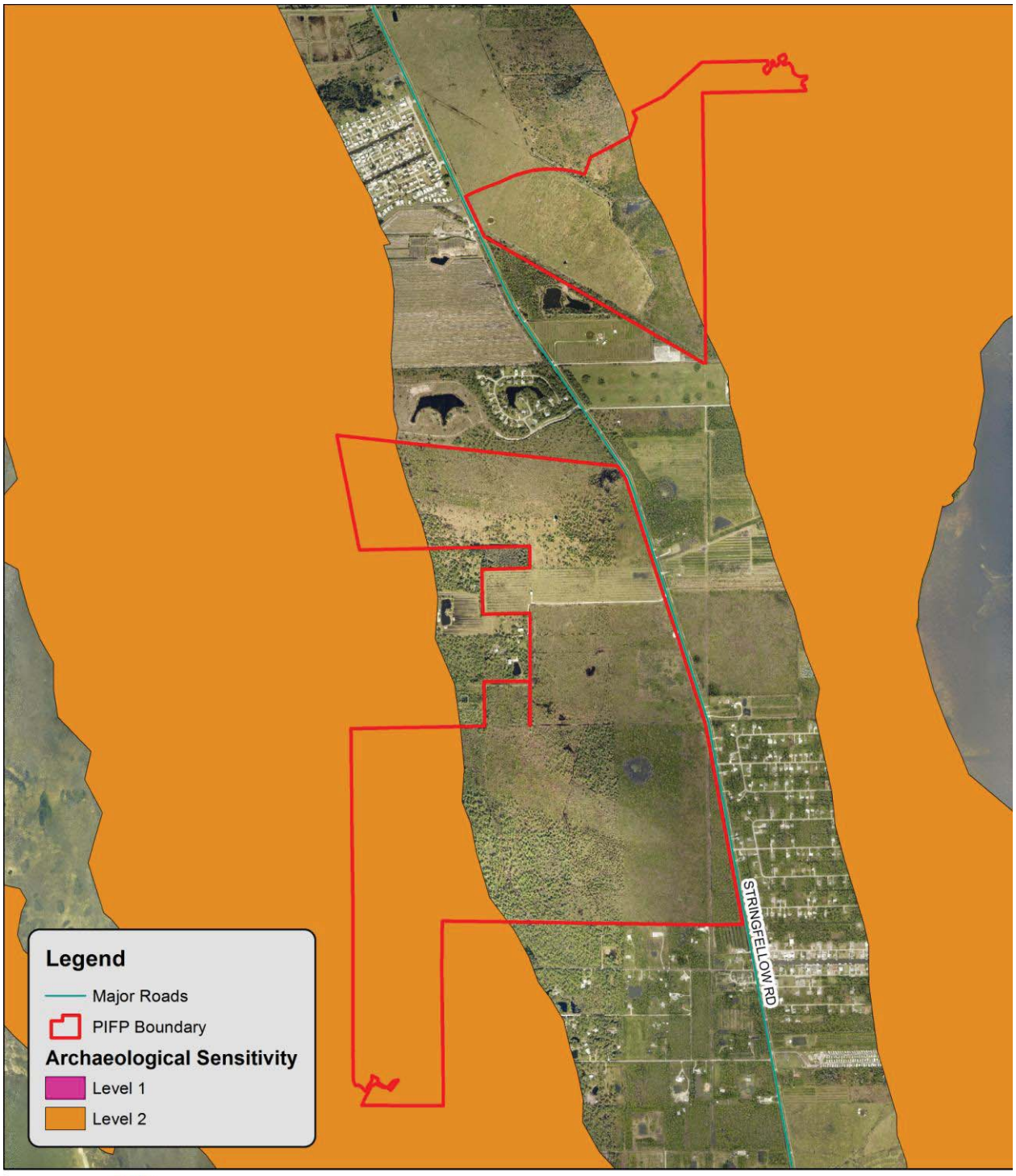
C. Cultural Resources

i. Archaeological Features

In 1987, Piper Archaeological Research, Inc. conducted an archaeological site inventory of Lee County. They created a site predictive model and archaeological sensitivity map for the county that highlighted potential areas likely to contain archaeological sites. The map shows the western third of PIFP and the eastern third of MU 14 and 15 being within the “Sensitivity Level 2” category (Figure 9). Because this designation suggests that there is a higher probability of these

areas having unknown archaeological sites within them, these areas are to be subjected to a cultural resource assessment survey by a qualified professional archaeologist before any impacts or significant soil disturbances. General information on archeological features in Lee County can be found in the LSOM.

Figure 9: Archaeological Map



ii. Land Use History

Land use history for PIFP is similar to much of the land in Lee County. C20/20 staff has reviewed available historical aerials; however, only a few representative ones are placed within this Land Management Plan (LMP).
Pine Island is approximately 17 miles long and 3 miles wide. Though not a barrier island, it is the largest island on the west coast of Florida and lies in the middle of the Charlotte Harbor Estuary. Human settlement on Pine Island most likely started about twelve thousand years ago with the Pre-Calusa Indians. The Calusa Indians were known to inhabit Pine Island up to 6,000 years ago.

Remnants of Calusa history still remain on the island in the form of shell middens, mounds, burial grounds and canals. The Randell Research Center at Pineland has preserved some of these well known Calusa sites. The Calusa survived by hunting and fishing and fashioned many tools out of the locally available material to assist in their daily activities. They lived in the same areas that are occupied today; Bokeelia, Pineland and St. James City. They lived on the island until the Spanish explorers arrived in the mid 1500s and either killed or captured and enslaved the Calusa. While there are no known Calusa sites on PIFP, the preserve is between known village sites and was most likely used by the Calusa for hunting and fishing.

European life began on Pine Island in the late 1800s when the area was settled by fisherman. The island was not accessible to the mainland by road until a bridge was built in 1927, and electricity was not brought to the island until 1941. Fishing remained an important way of life with a more recent shift to ecotourism and tropical nurseries. As the human population has grown, the natural areas have been cleared for development and agriculture. From the late nineteenth century until the 1930s, intense logging of longleaf and slash pine virtually eliminated all virgin stands of the southern mixed forest in south Florida. It is not known how much of the preserve was logged at this time, but some slash and longleaf pine still remain on site.

Aerial photographs (Figures 10-15) were used by land management staff to determine land use changes on PIFP. There were three major disturbances on the land that is now PIFP. The first is a small square area (19 acres) in MU 6 along Stringfellow Road that was cleared for citrus. Aerial photographs from 1953 show this as a cleared area, so it is not known exactly when the work was done before the aerials were taken. The second large disturbance happened in MU 14 and15 when the agricultural field was cleared of all vegetation between the 1953 and 1958 aerials. The third large disturbance at PIFP is in the northwest corner of MU 1. In the mid-1960s, approximately 10 acres were cleared to create a shrimp farm. Three ponds and their associated ditches and canals were dug. It is not known whether the business profited, but it was abandoned by the mid 1970s and is now overgrown.

Other disturbances include cow wells in MUs 4, 6, 10 and 14 that were excavated in the mid 1980s and early 1990s, respectively. In the mid 1990s, the understories of MUs 3 and 4 were cleared for pasture and grazing which continues today. Grazing began on portions of MUs 8, 9 and 10 in the mid 1990s and the area was cleared for pasture around 1999.

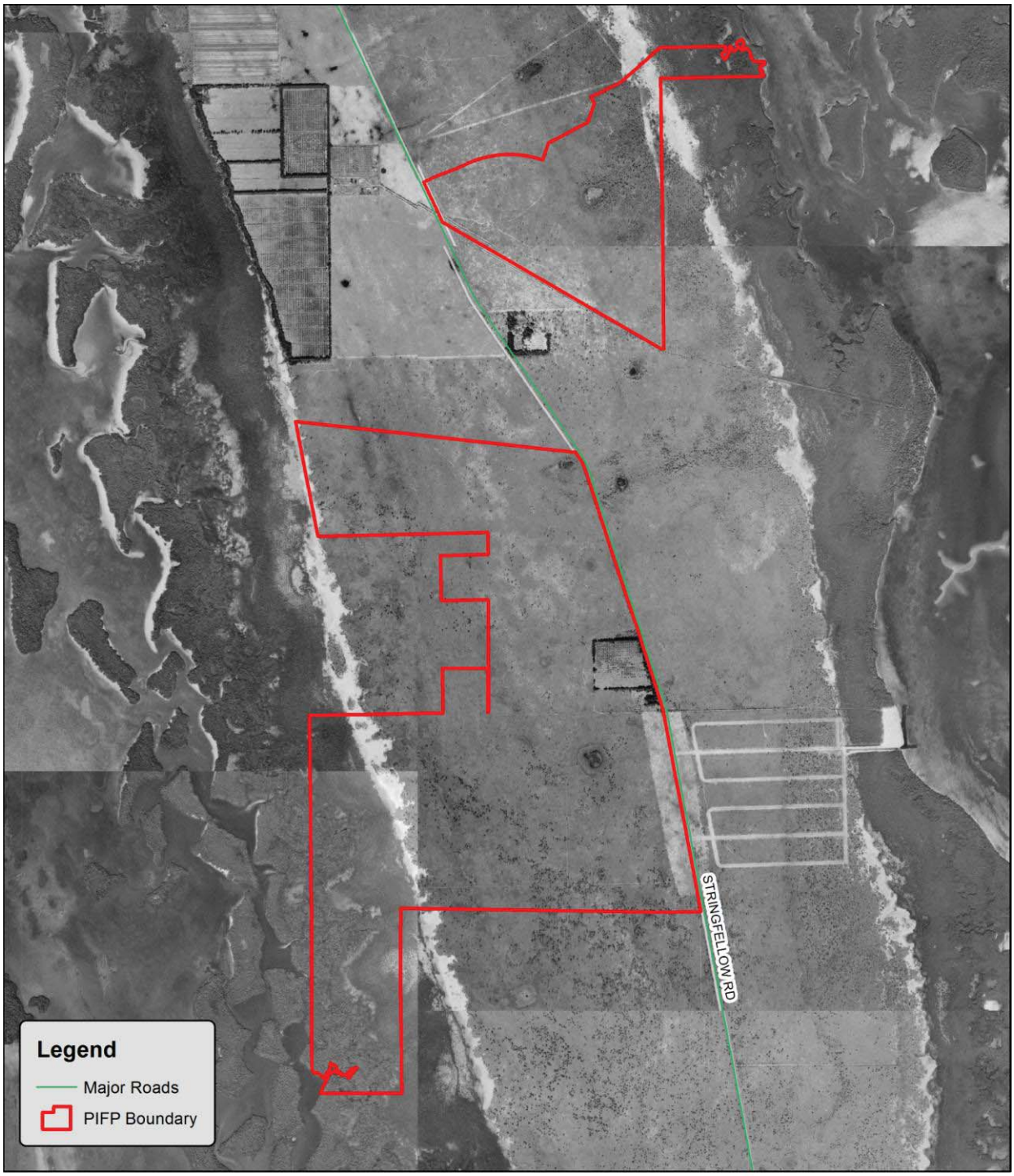
Beginning in the 1970s through the 2000s both the native and exotic vegetation on the site began to grow thicker. This is often linked to fire suppression and lack of prescribed burns. In 1970, the power line that is the western boundary of MU 11 was installed. There is also an east/west powerline that runs between MUs 6 and 9 that was installed in late the 1980s to provide power to the homes to the west of the preserve. In the late 1980s or early 1990s, MU 13 had been cleared of its natural vegetation and furrows had been installed as rows of palms were grown to be commercially harvested.

The final disturbance occurred in the late 1990s when Lee County Utilities signed a contract with the former land owner, Village Links Land Trust, to use the site for treated effluent water release from the Pine Island Wastewater Treatment Facility (Appendix E). The Utilities Department installed a series of sprinklers set up on a grid across the pasture in MUs 3 and 4 for the effluent delivery. Effluent was only released onto the preserve for 20 days in 2005 and is only used in emergency situations at this time. In 2009, the Lee County Utilities agreement was renewed with Lee County Parks and Recreation. As growth continues on Pine Island, the need for effluent release at this site may increase. Land Stewardship staff will work with Lee County Utilities staff to ensure the protection of the natural systems on site with the possible future increase of effluent released.

In 2013, Monitor well MW-5 was installed within the Preserve by LCU to monitor groundwater quality in the spray field as part of their FDEP wastewater disposal permit. It exhibited high levels of arsenic in the groundwater starting in 2013, which persisted until the well was abandoned by the County in 2016. The well also exhibited low pH throughout its period of record. The level detected exceeded drinking water standards. No homes on Pine Island are known to use the shallow surficial aquifer for potable water supply. The well was abandoned by the Lee County Utilities Department in 2016 when they revised their permit in 2015 to modify the groundwater monitoring plan for the facility. Conservation 20/20 staff will work with Natural Resources Division staff to assess the arsenic source and low pH. A monitoring plan will be developed and remediation performed if determined to be needed.

PIFP is also home to several active bald eagle nests. The nests have been intermittently active since 1990 and have successfully produced many fledglings.

Figure 10: 1953 Aerial



CONSERVATION 20/20
LEE COUNTY Parks & Recreation

N

Pine Island Flatwoods Preserve

This is not a survey.
Land Stewardship Staff has prepared this map for informational and planning purposes.

0 625 1,250 2,500 3,750 5,000
Feet

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Figure 11: 1958 Aerial

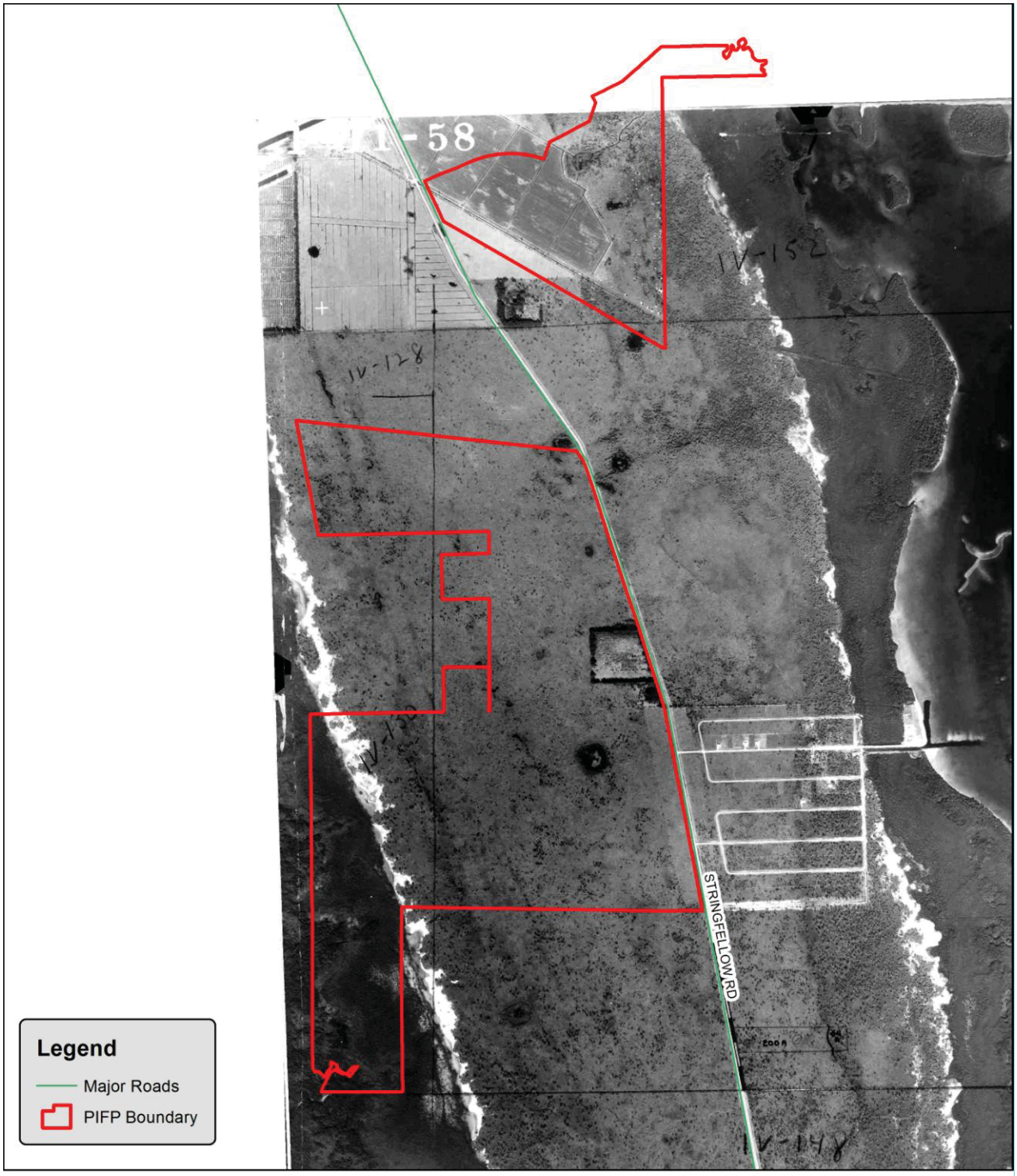


Figure 12: 1972 Aerial

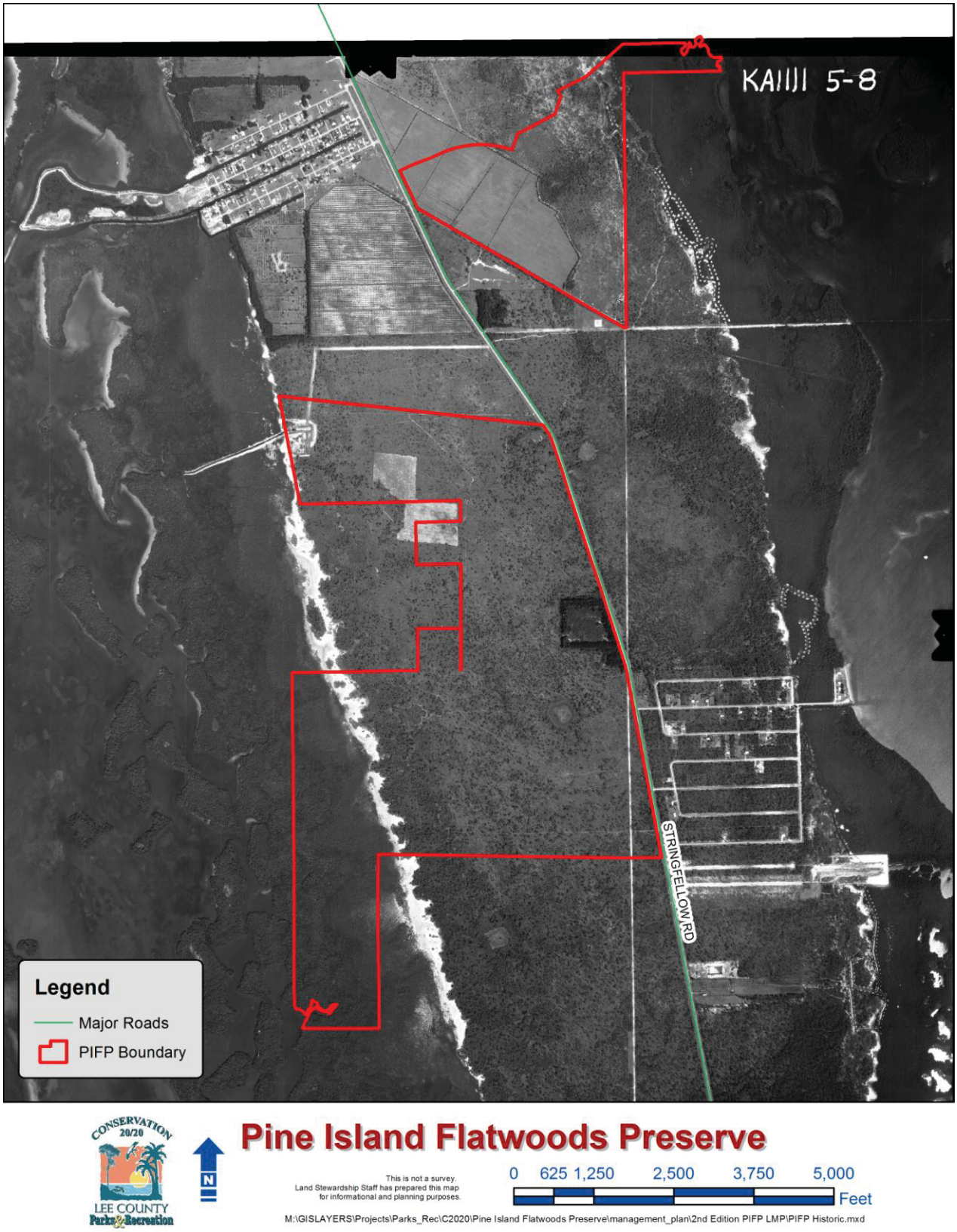


Figure 13: 1986 Aerial

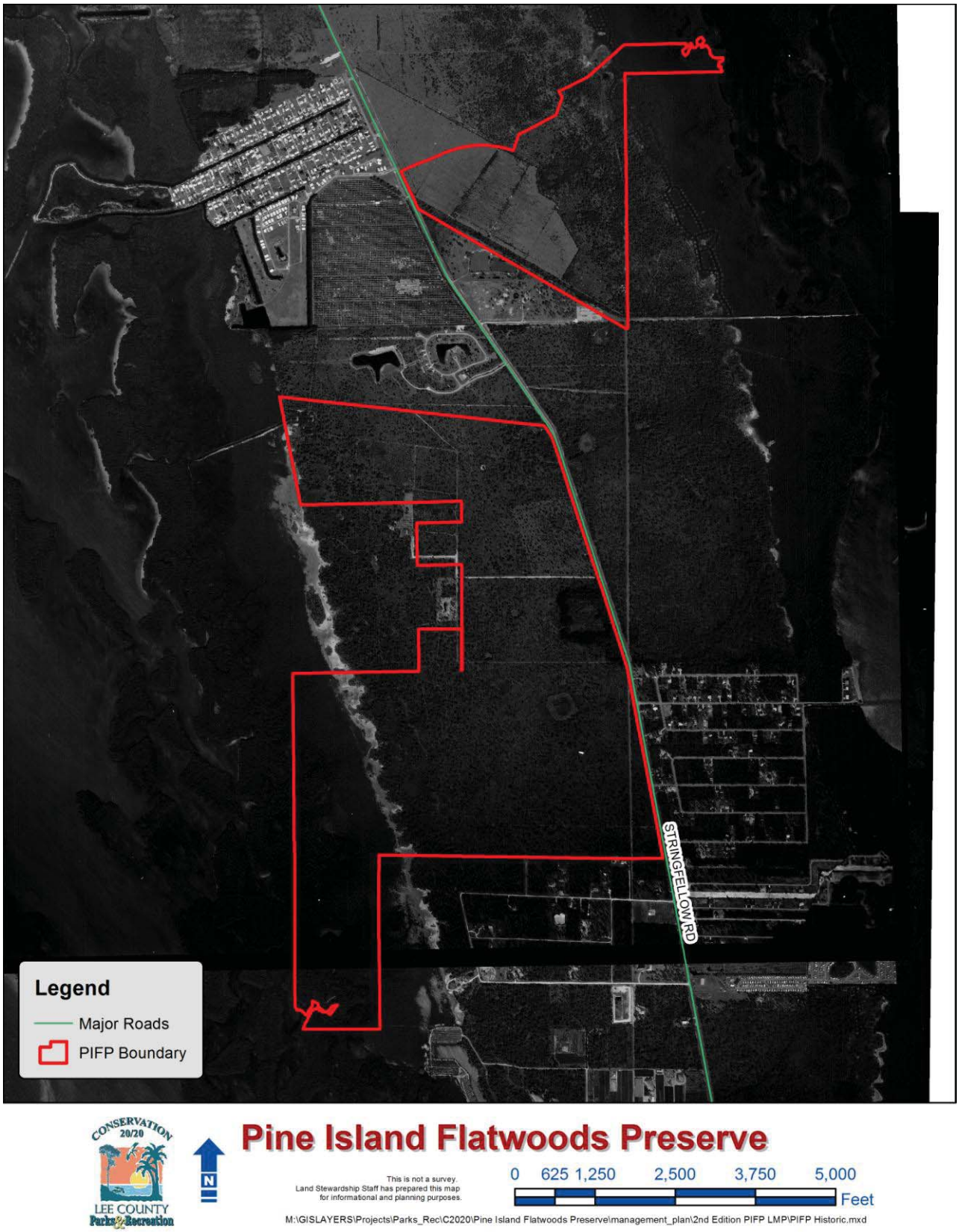


Figure 14: 1998 Aerial

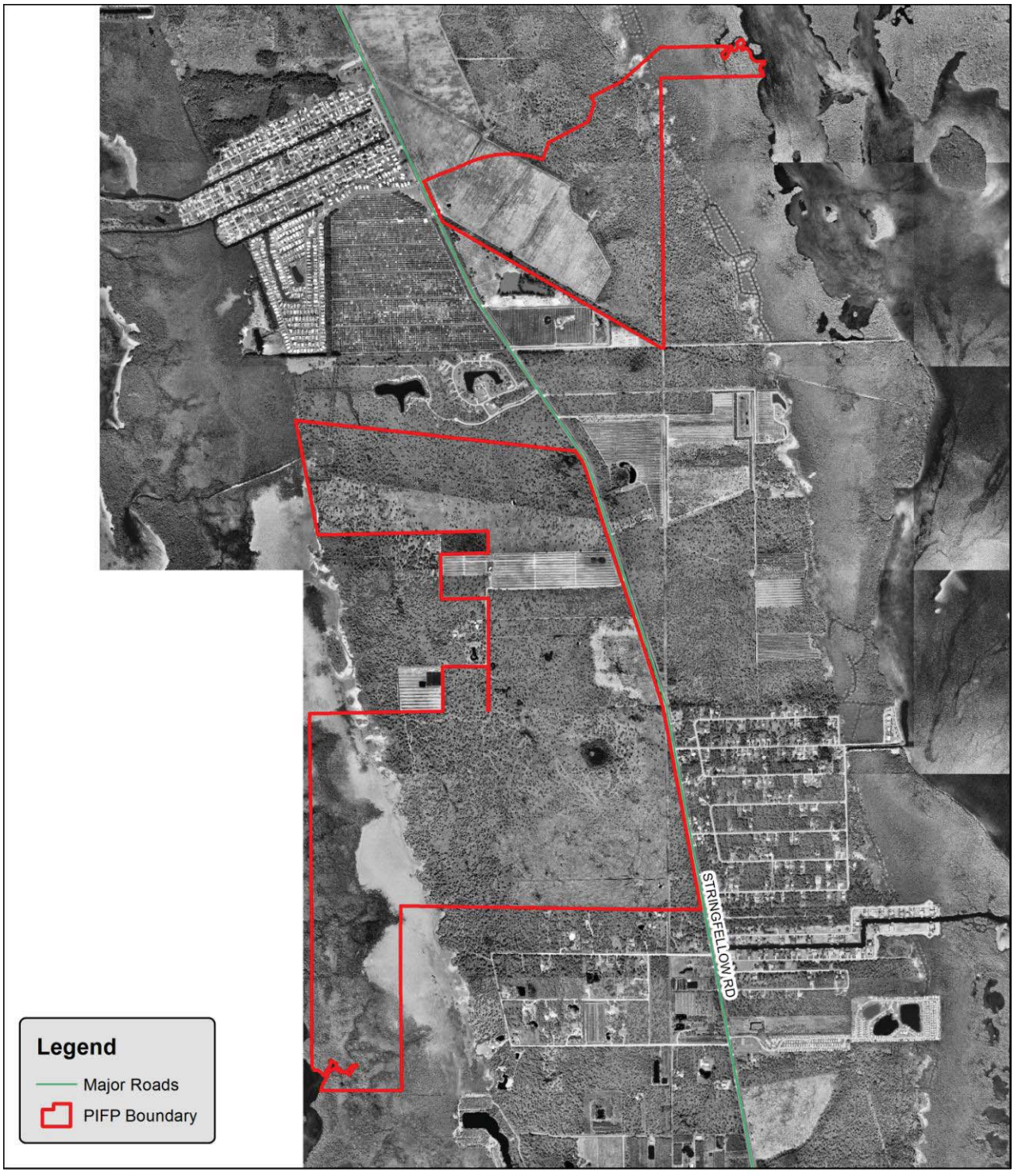
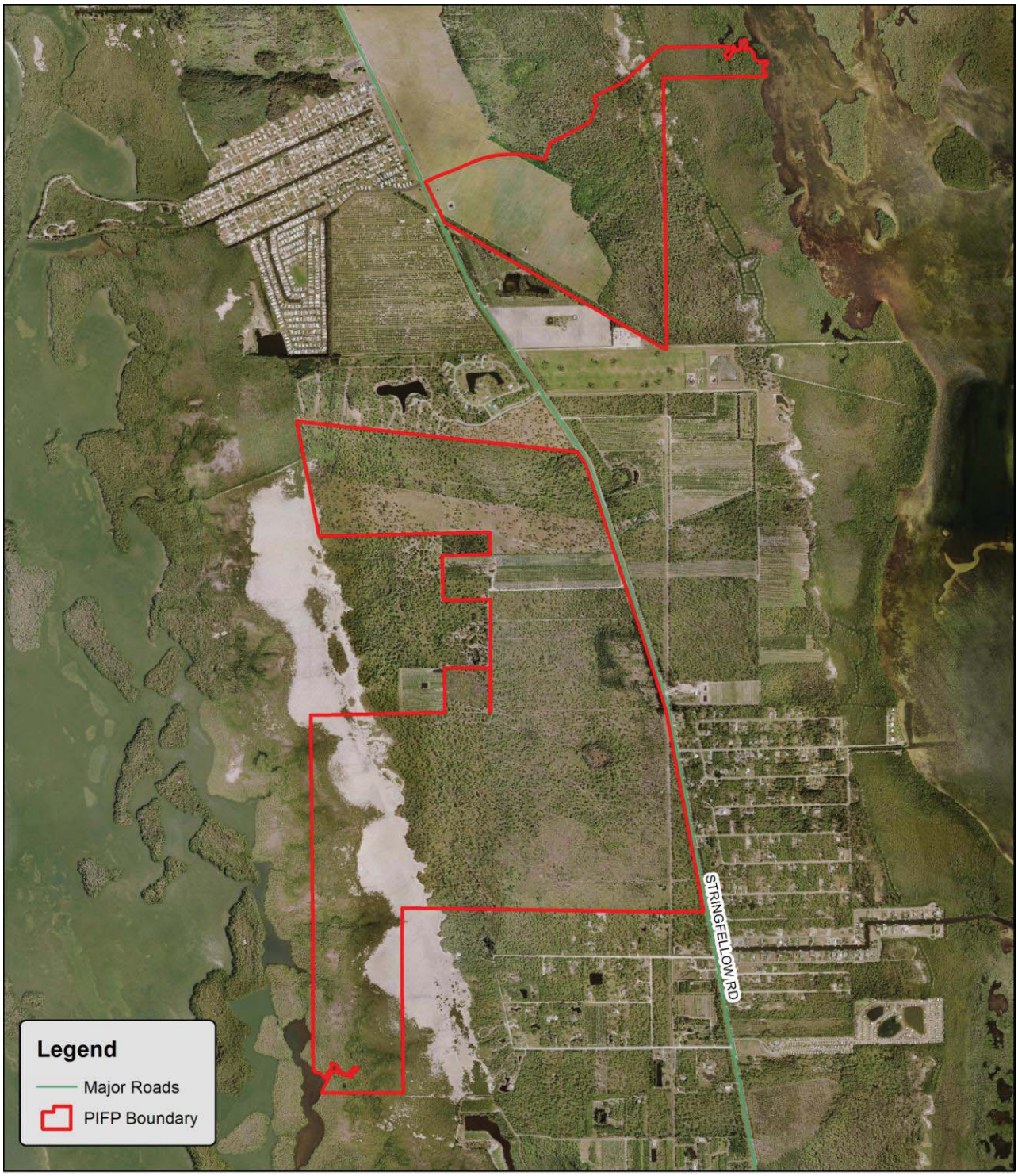


Figure 15: 2002 Aerial



iii. Public Interest

Historically, the preserve was used for timber production, cattle grazing and agricultural farming. As private lands the parcels that make up PIFP were for the most part closed to the public. However, the acquisition of the preserve into the C20/20 program has allowed for the conservation of this environmentally sensitive land, habitat for listed species, and protection of coastal resources while allowing public access and limited recreational opportunities.

Staff and volunteers have conducted field trips with various community groups and the general public, to increase public awareness on various topics including the importance of conservation, native plant communities, birding opportunities and other natural history topics. In 2011, volunteers began leading Saturday guided walks during the cooler dry season for the general public and tourists.

Since the original management plan was written, some users have shown interest in additional uses such as dog walking bike riding and equestrian use at the preserve. These requests have been considered, but due to the nature of management at the preserve, they will not be allowed. Dog walking is not allowed because of the high population of gopher tortoises on site. This is one of the principle species being managed for on the site. The hiking trail on the preserve is only 1.12 miles long with rough terrain, and the firebreaks are very loose and sandy. Neither of which supports good bike trails. For horseback riding, there is no existing space for horse trailer parking. Due to high cost, further habitat loss, high traffic on Stringfellow Road and the possible need for the addition of a turn lane, it is not feasible to add a new parking area large enough to accommodate horse trailers. In addition, Conservation 20/20 does not have staff available to maintain equestrian safe trails.

The Calusa Land Trust annually holds workdays on the preserve and helped to remove exotic plants to maintain the natural system. Other individuals and community groups have volunteered to help with trail trimming, amenities upkeep, invasive exotic plant control and wildlife monitoring.

Information concerning this and all C20/20 preserves and other Lee County preserves can be found on the web site along with copies of their associated stewardship plans when available (www.conservation2020.org). Staff may mail informational newsletters when activities are scheduled to take place that the preserve neighbors may be interested in.

V. FACTORS INFLUENCING MANAGEMENT

A. Natural Trends and Disturbances

Natural trends and disturbances influencing native communities and management at the preserve can include hurricanes, flooding, wildfires, occasional freezes, and the pattern of wet and dry seasons. Implementation of

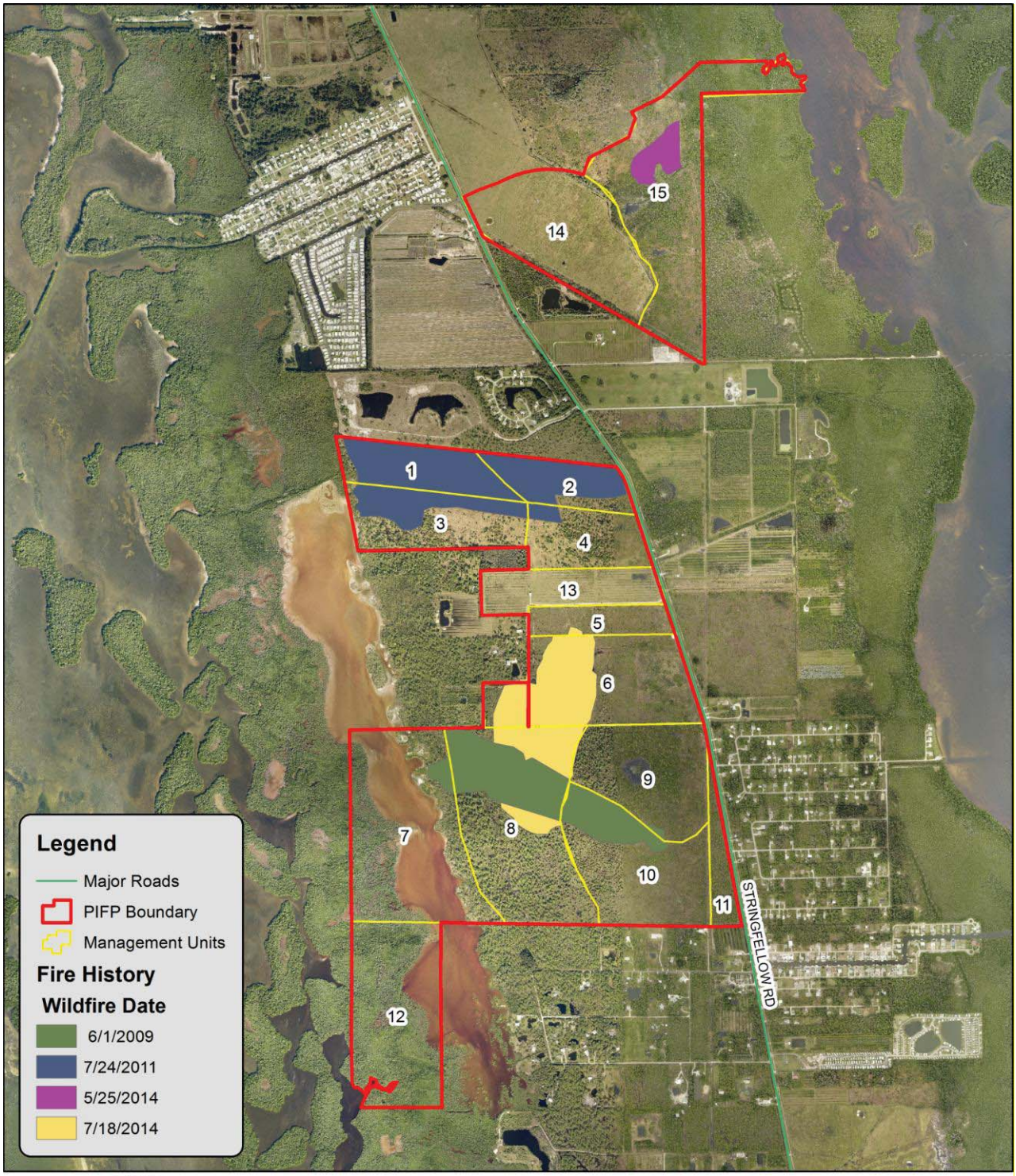
the Management Action Plan will take all of these factors and their influence on projects at PIFP into consideration. General information on natural trends and disturbances influencing native communities and management at PIFP can be found in the LSOM's Land Stewardship Plan Development and Supplemental Information section.

Wildfires caused by lightning strikes are natural occurrences in Florida. The Florida Forest Service (FFS) – Caloosahatchee District - and Conservation 20/20 staff have developed a wildland firefighting protocol for county preserves. The FFS and the Pine Island/Matlacha fire district were provided a map of the preserve showing the locations of access points, firebreaks, management units and water sources. The FFS will utilize existing firebreaks to contain wildfires at PIFP whenever possible. No new firebreaks, such as plow lines, will be created unless there is potential for the wildfire to harm property outside the preserve boundary. This agreement between FFS and the County will protect PIFP from the potential damage associated with emergency firefighting equipment. Conservation 20/20 staff will lead periodic site visits in order to familiarize FFS with PIFP and current management efforts. Fire lines on the perimeter of the preserve, as well as those dividing up the management units, will be kept clear of debris and disked or mowed a minimum of once a year during the onset of the dry (wildfire) season.

Invasive exotic plants are an on-going disturbance to natural areas within PIFP. In addition to the rapid colonization of invasive exotic plants, there have been four documented wildfires on the preserve since it was acquired by Lee County (Figure 16). One lightning strike wildfire, that started in the northeast corner of MU 7 totaled 53 acres and burned parts of MU 7, 8 and 9 on June 1, 2009. On July 24, 2011, an 80 acre wildfire started on private property adjacent to MU 2 and burned across units 1, 2, 3 and 4. A lightning caused wildfire started on May 25th, 2014 in MU 15 and burned 9 acres. On July 18, 2014, another lightning caused wildfire burned 72 acres across MU 5, 6, 8 and 9. FFS responded to the fires and installed containment lines. C20/20 staff worked to rehabilitate the lines afterward.

Land management (invasive exotic plant control, prescribed burning, etc.) of PIFP is influenced by seasonal hydroperiods. The LSOM's exotic plant prescription form will be used to define the conditions for control activities. Care shall be taken to prevent herbicide from running off during a typical summer thunderstorm so as not to affect non-target plants. Only herbicides approved for aquatic application will be used for treatment of vegetation in standing water or where flooding may occur. The timing of prescribed burns will also be influenced by seasonal rain, weather and wind patterns.

Figure 16: Wildfires Map



B. Internal Influences

Several human influences have impacted PIFP, the largest of which has been cattle grazing. MU 14 and portions of 15 have had a cattle grazing lease that ended in 2016 and the open pasture area of unit 14 will be restored to native plant communities. There is also an active cattle lease in management units 1,2,3,4 and 13. The active cattle leases will be up for renewal in September annually. At that time, Conservation 20/20 staff will evaluate the effect of cattle on the natural vegetation to determine if the lease should be renewed.

The contract with Lee County Utilities for the effluent water release also places constraints on MUs 3 and 4 because work in these areas must be scheduled around water release times. Lee County Utilities has been asked to notify land management staff before any water is released on site to coordinate management activities.

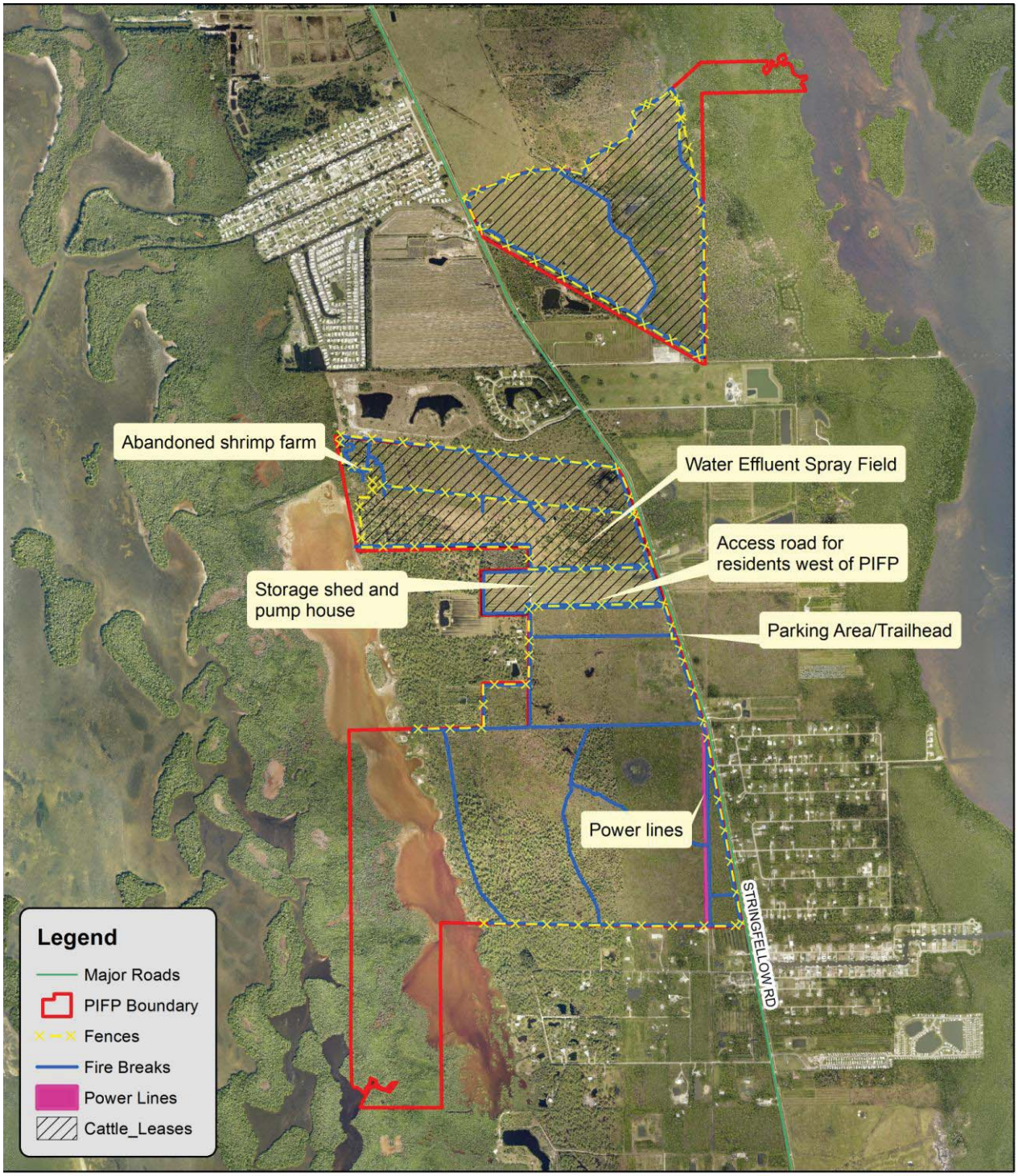
The abandoned shrimp farm in the northeast corner of MU 1 alters the natural sheetflow in this area. The ponds created in this area hold water and divert it from reaching the mangrove fringes. Also, many exotic plant species, including Brazilian pepper and melaleuca, continue to return but are periodically treated in this disturbed area. Another alteration that possibly disturbs the natural sheet flow is the road bed on the southern boundary of MU 5, where there is a small swale on the south side of this road. There is also a small ditch that runs under the power line on the western boundary of MU 11. Management units 14 and 15 are separated by a large agricultural drainage ditch and southern boundaries of these units are also bordered by a large, unmaintained LCDOT drainage ditch. There are still remnant dozer plow lines throughout many of the management units, as a result of wildfire suppression, that alter sheetflow, but native vegetation has become established on these so they will be allowed to remain.

A power line crosses a portion of MU 6 and runs down the firebreak between management units 6, 8 and 9 and a transmission line crosses the preserve to split MU 11 from units 9 and 10. In management unit 13, there is a storage barn with a separate pump house and two wells measuring 4 and 8 inches in diameter. These structures came with the property when the palm grove lease ended and management was turned over to C20/20. The storage barn is now used as a storage facility for the maintenance staff, and the pump house/wells are utilized as a water source for washing equipment, and water refill during prescribed fire and wildfire suppression.

In the summer of 2003, a request was made by the Matlacha Pine Island Fire Control District to remove the Australian pines that were growing along Stringfellow Road to reduce the blow down potential in the event of a hurricane. This approximately 20 acre area in MU 6 had previously been used as a citrus grove prior to 1944, but once the grove was abandoned, melaleuca and Australian pines invaded. Work was started in August 2003 with a Brontosaurus, mulching machine, to clear about 19 acres of melaleuca and Australian pines in

MUs 5, 6 and 9. Following this, in November 2003 the Australian pine stumps were removed with an excavator and piled and burned. Follow-up herbicide treatments occurred on the site in February, April, July and October 2004 and September 2005. Native plants have since established throughout the area.

Figure 17: Internal Influences Map



C. External Influences

Roadways can have a detrimental effect on wildlife. Some examples are direct habitat loss from road location, fragmentation of habitat, and alteration of behavior by wildlife avoiding roads and surrounding lands. Road mortality is the number one direct cause of death to wildlife by humans in the US. Roads have a particularly significant impact on large carnivores with low reproductive rates, low population densities and large home ranges, such as black bears and Florida panthers. Quite often, roads and highways cut through their home range, fragmenting prime habitat and creating hazardous obstacles for migrating carnivores (American Wildlands 2002). PIFP is split by two-lane Stringfellow Road. Additional small residential roads and communities surround PIFP to the north and south. These communities and road along with the distribution power lines (Figure 18) will influence prescribed burning on the property. Specific winds will be required to burn in order to keep smoke away from these types of smoke sensitive areas during prescribed burns.

Just north of MU 14 and 15 is another conservation area called Pine Island Preserve at Matlacha Pass. While well maintained and burned regularly, this preserve does include fire dependant plant communities and has moderate fuel loads of palmetto and pine. This area is an additional consideration when planning prescribed burns on the site due to its capability of carrying a wildfire across it and into units 14 and 15. Planned public use on Pine Island Preserve at Matlacha Pass will bring more people onto MU 14 and 15 as connecting trails are constructed.

Figure 18: External Influences Map

D. Legal Obligations and Constraints

i. Permitting

Land management activities at PIFP may involve obtaining permits from regulatory agencies. Any hydrologic improvements being proposed for the site, could possibly require obtaining permits from the Florida Department of Environmental Protection (FDEP), the U.S. Army Corps of Engineers (USACOE) and SFWMD. Hydrological and/or habitat restoration projects requiring heavy equipment or tree removal will require notification to the Lee County Department of Community Development (LCDCD). Burn authorization from FFS and the Matlacha/Pine Island fire district are required for all prescribed burns conducted on PIFP.

ii. Other Legal Constraints

There is currently an active cattle lease on management units 1,2,3,4 and 13. If this cattle lease proves to be detrimental to the natural communities or restoration work on the site, it will be terminated. See Appendix G for a copy of the cattle lease.

The contract with Lee County Utilities for the effluent water release site also places constraints on MUs 3 and 4 because work in these areas must be scheduled around water release times. Lee County Utilities has been asked to notify land management staff before any water is released on site to coordinate management activities (Appendix E).

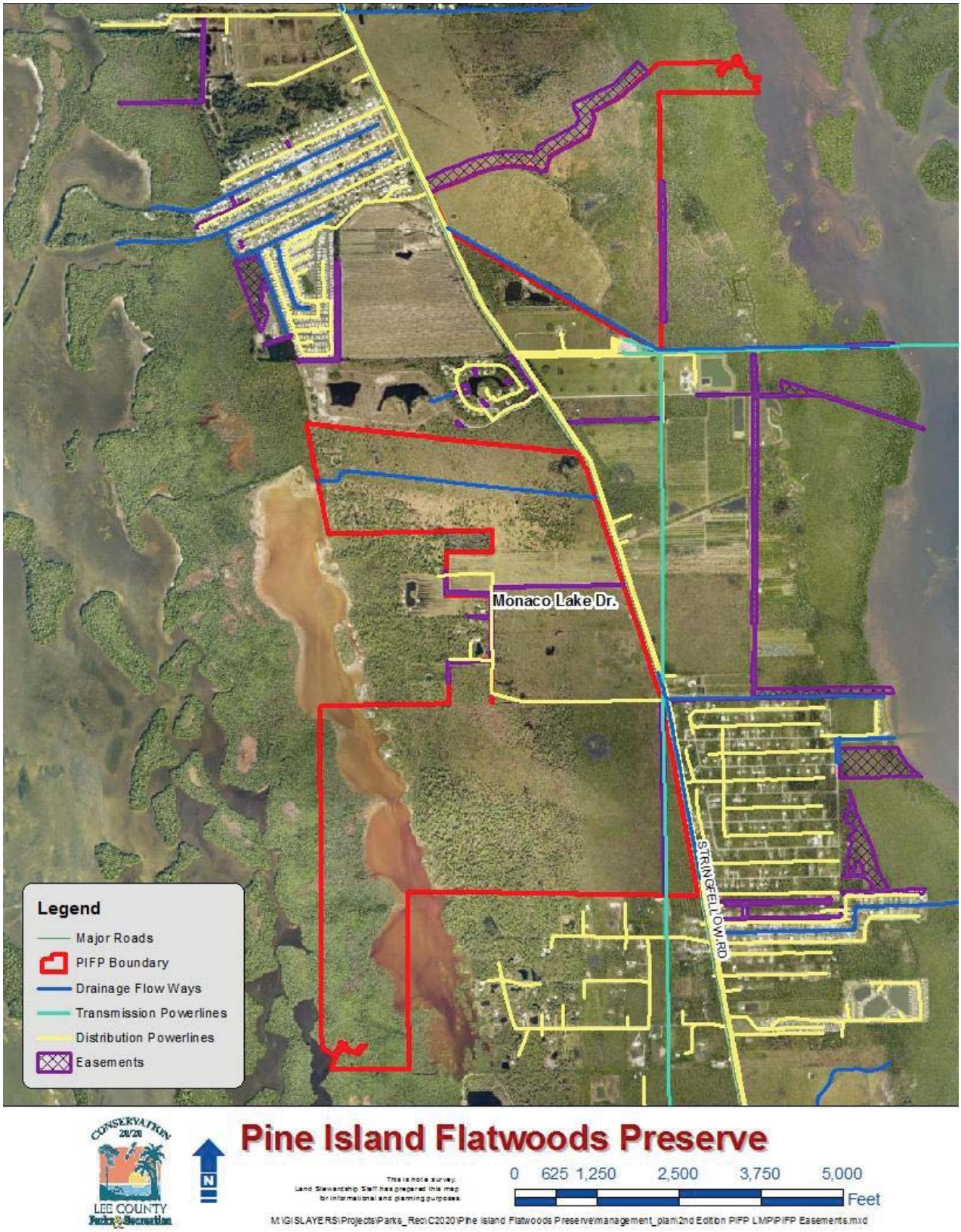
Numerous easements affect PIFP (Figure 19). A 60 foot wide road easement, Monaco Lake Drive, has been created between management unit 13 and 5 and along the western boundary of MU 6 to provide access for residential property located west of the preserve. These residents previously owned an easement which bisected MU6, but agreed to an easement swap with C20/20 that allowed the property owners to continue to utilize the access which they were already using without the need to clear a road through the preserve. The 60 foot easement swap included a portion of MU 5 and 6 so new boundary fence and firebreaks had to be installed.

Lee County Electric Cooperative (LCEC) currently maintains a 100 foot wide right-of-way access easement under a transmission powerline which runs north to south on the western border of MU 11 and a small portion of the southeast corner of MU 15. LCEC also maintains a 10 foot wide access easement under a distribution powerline which runs in a general north/south direction between the east side of Stringfellow Road and the west side of MU 14. An extension of this distribution powerline runs along the east side of Stringfellow Road until it crosses at MU 6 and runs toward the west along the unit's southern border and a portion of the northern border of MU's 8 and 9. This powerline makes another juncture and runs north/south through a portion of MU 6, jogs along the northwestern boundary of MU 6 and the western boundary of MU 5 before cutting

into MU 13. This unit is the location of the preserve's storage shed, where the powerline turns abruptly west and crosses through the west border of MU 13 toward private property.

Other easements along the boundaries of PIFP include a conservation easement along the northern boundary of MU 14 as well as the northern and eastern boundary of MU 15, and drainage flow way easements along the southern boundary of MU 14 as well as the southern boundary of MU 1 and 2. The drainage ditches are privately maintained by residents of the area to redirect runoff in an effort to reduce the risk of flooding along Stringfellow Road and in the residential communities.

Figure 19: Easements Map



iii. Relationship to Other Plans

The Lee Plan, Lee County's comprehensive plan, is written to depict Lee County as it will appear in the year 2020. Several themes have been identified as having "great importance as Lee County approaches the planning horizon" (LCDCD 2016).

The entire Lee Plan can be found online:
http://www.leegov.com/dcd/Documents/Planning/LeePlan/Leeplan.pdf
The sections of the Lee Plan which may pertain to Conservation 20/20 Preserves have been identified in the LSOM.

E. Management Constraints

The principle management constraints for PIFP include limited funding, the brief dry season for management activities and conducting land management activities concurrently with present and future recreational use. Although C20/20 has a management fund, it is inadequate to fulfill the restoration activities for this and other preserves. Efforts to obtain additional funding through grants and/or monies budgeted for mitigation of county infrastructure projects will be pursued. These funds will be used to supplement the operations budget to meet the restoration goals in a timely manner.

Large portions of Pine Island Flatwoods Preserve are wet most of the year. January through April are typically the driest months. Management activities will typically need to be conducted in these months. If access is necessary for management when water levels are high, motorized vehicle travel will be minimized. Vehicles and other motorized equipment are discouraged from driving through wetland communities.

When potentially dangerous restoration activities are being conducted, such as work utilizing heavy equipment or conducting prescribed burns, signs will be installed at the entrance and on the trail near the management activity to warn the public that the area is temporarily closed. During and after prescribed fires, the entire preserve will be closed to the public until the site is safe for visitors.

Growing development on the island along with the presence of powerlines on the preserve pose unique challenges to prescribed burning. Smoke management will be one of the greatest factors in planning prescribed fires. Urbanization pressures have increasingly affected management activities and boundary security. Fire management is a vital tool used to keep fuel loads down, to ensure biological diversity, to maintain functional habitat value for wildlife and to reduce the severity of wildfires. Prescribed fire parameters become more restrictive with expanding residential and commercial development, increased traffic on nearby roadways and surrounding airports. Additionally, being an island, Pine Island is

largely affected by winds on all sides. Particularly, the afternoon sea breezes, which are major constraints for prescribed burning on the island.

Restoration activities near any bald eagle nests will be restricted to between May 16th and September 30th (outside of nesting season) and mainly during the dry season, which varies from year to year. A buffer zone of 660 feet around an active nest will be utilized where no mechanical or hand crew work will take place during nesting season. Prescribed burns will be planned to provide as much protection as possible to the nest tree and adjacent perches during burning. The cattleman and Lee County Utilities will be notified prior to any restoration activities in MUs 1-4.

Lee County Utilities signed a contract with the former land owner to release effluent water on the site from the Pine Island Wastewater Treatment Facility in 1999 and renewed the contract in 2009. The site is used on a limited and emergency only basis. Staff will review the semi-annual monitoring reports to determine the effects of the effluent release on the native plant communities.

F. Public Access and Resource-Based Recreation

A parking area for the general public was constructed in 2007 on Site 168 at 6201 Stringfellow Road, which provides access to the trailhead of the designated 1.12 mile long hiking trail (Figure 20). Trail maps and educational panels are available to the public at the trailhead, as well as preserve signage indicating the allowed recreational activities. PIFP currently offers opportunities for bird watching, hiking, and nature study or photography. Geocaching is also offered at the preserve, but the placement of a cache must be permitted though C20/20 staff. In order to protect the resources on the preserve, there are no pets allowed on any portion of PIFP. Seasonal guided walks led by Conservation 20/20 volunteers occur at the preserve once a month, free of charge and follow the designated trail while presenting historical, cultural, and environmental topics.

The designated trail was installed in 2005 and has been maintained by mowing at least once a year. A trail map located at the trailhead and trail markers enable visitors to navigate the designated trail system. Periodically, small portions of the trail may have standing water throughout the wet season, but the trail may remain open for those visitors willing to hike on wet trails.

Visitors can also explore more of the preserve by utilizing unmarked firelines (not blocked by closed gates) but staff does not recommend public access to the northern portion (MU1-4, 13) of the preserve for the following reasons:

1. MU 1-4 and 13 currently have active cattle leases, and the cattle could pose a threat to the public.
2. Lee County Utilities uses MU 3 and 4 for effluent releases from the Pine Island Wastewater Treatment Plant. There is no schedule or warning signal for effluent releases at this site.
3. Bald eagles have historically used this area for nesting, and the buffer for the primary eagle nesting zone established to minimize impacts to the birds encompasses a majority of MU 1-4.

The preserve will be closed to the general public during certain restoration activities, prescribed fires, and hog hunts. There will be signage at the designated trailhead as well as an online news release on the PIFP webpage and the Conservation2020 homepage that will alert visitors of any current or upcoming trail and preserve closures.

Future projects to increase the recreation opportunities at PIFP include a hiking trail in management units 14 and 15 that will be connected to the trail system that will be installed and managed on the property to the north. This hiking trail addition will be part of a partnership between Conservation 20/20 and the neighboring Pine Island Preserve at Matlacha Pass, conservation land owned and managed by CFGC. Creation of a hiking trail and boardwalk on the CFGC property, will be constructed as both conservation properties undergo large-scale

restoration projects. The CFGC portion of the project will include public amenities such as a parking lot and restroom facilities, and will expand an existing trail system to incorporate a new boardwalk leading to a kayak/canoe launch (Appendix D). The PIFP portion of the project will include the construction of a trail segment that ties into the previously mentioned trail system at Pine Island Preserve at Matlacha Pass.

Any future C20/20 resource based recreation additions to PIFP will be made by staff attempting to provide for the needs of the public while keeping in consideration the lack of daily staff to protect and maintain public use amenities, presence of listed plant and animal species, and construction costs. Formation of a volunteer group will continue to be encouraged to assist staff with trail maintenance, wildlife monitoring, and other land management projects.

Figure 20: Current and Proposed Hiking Trail System Map

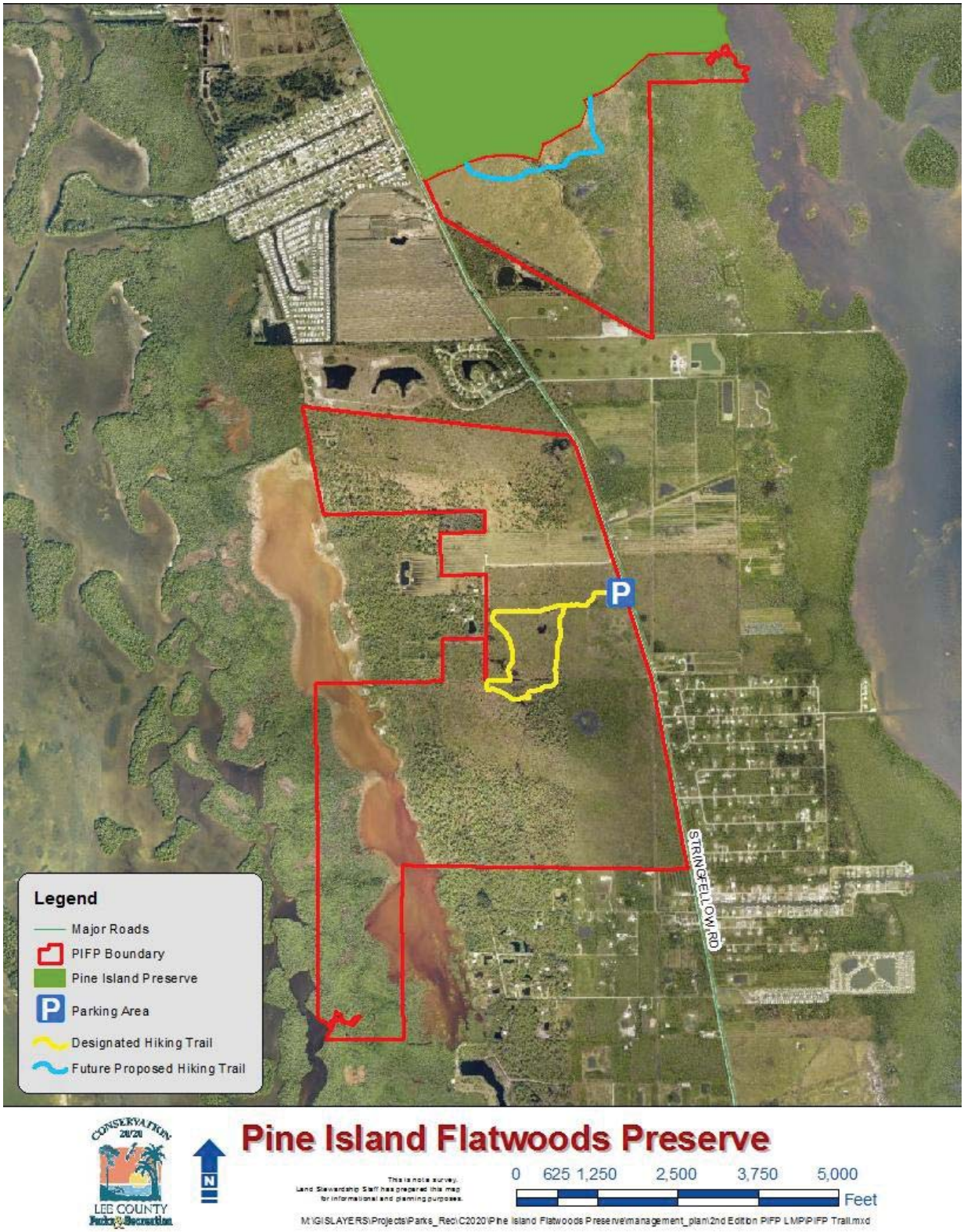
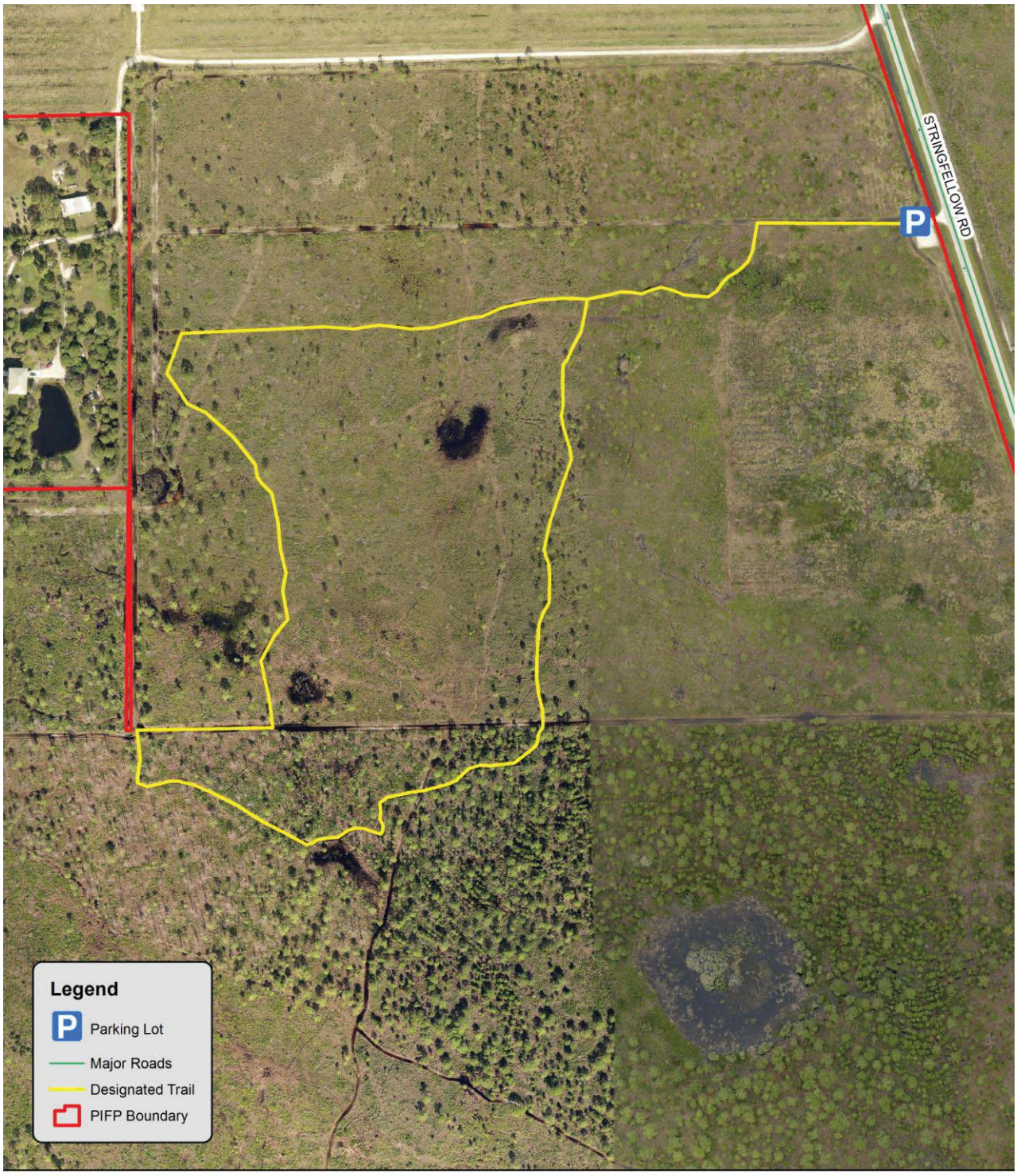


Figure 21: Current Designated Hiking Trail Map



G. Acquisition

Pine Island Flatwoods Preserve was purchased in eight parcels with a total cost of $9,251,904.00 for a total of 919.64 acres (Figure 22). All of these nominations were significant to the C20/20 program for the large amounts of undisturbed land and because they were adjacent to existing conservation lands. Each acquisition cost was derived from the property's inventory card and may not include cost of additional professional services, such as additional land surveys, or donated acquisition funds.

- Nomination 092 – $8,500
  This 80.6 acre site was the first acquisition for the preserve in May 2000, and consists predominately of mangrove forests that now make up MU 12. The nomination was an important purchase because it is located adjacent to state owned lands and borders the Pine Island Sound Aquatic Preserve.

- Nomination 147 – $629,504
  Comprised of 59.3 acres of mesic flatwoods and abandoned citrus groves, this site was purchased in March 2001 and accompanied a $10,000 donation by CLT for management of the preserve. This money funded the removal of exotic plant species along Stringfellow Road.

- Nomination 168 – $355,000
  This 33.2 acre site was purchased in July 2002 and now makes up MU 5. The site is dominated by mesic flatwoods and was once divided by a resident road access easement as the previous route of Monaco Lake Drive ran east/west from Stringfellow Road to the private land to the west of the preserve.

- Nomination 121 – $2,829,000
  The largest parcel acquired for this preserve was purchased in April 2003 and includes 364.9 acres of a variety of plant communities in the southern half of the current preserve area. Mesic flatwoods, mangroves, tidal swamps, and hydric hammock are just some of the plant communities that thrive within this parcel and make it a valuable addition to the preserve.

- Nomination 184 – $2,116,400
  One of the more disturbed parcels, this site is 148.1 acres purchased by C20/20 in March 2005 with assistance of a $10,000 contribution from the CLT. This site now makes up MU 1-4 and provides critical habitat for many protected animal species including nesting bald eagles and gopher tortoises.

- Nomination 346 – $1,268,500
  This 34.5 acre site was purchased in June 2008 as a connector for the north and south portions of the preserve and now makes up MU 13. At the

time of the acquisition, the site contained a palm tree nursery, storage facility, and agricultural well pump.

- Nomination 402 – $245,000
  The smallest parcel acquired for the preserve, this site is comprised of 9.9 acres and was purchased by C20/20 in December 2008 with assistance of a $5000 contribution from the CLT.

- Nomination 389 – $1,800,000
  The last acquisition to date was purchased in August 2011 and includes 189.9 acres located northeast of the main preserve area. This site contains important mangrove swamp plant communities, and neighbors conservation land owned and maintained by the CFGC. The CLT and CFGC each contributed $10,000 toward the purchase of this site, and the CFGC provided an additional $200,000 donation to be used toward restoration of the site.

PIFP is currently zoned under multiple labels including: “Light Commercial”, “Agriculture”, and “Single-Family/Duplex Residential” (Figure 23). The listed future land use for the site includes: “Coastal Rural”, “Conservation Lands Upland”, “Conservation Lands Wetland”, and “Wetland” (Figure 24). Conservation Lands staff recommends that the zoning categories be changed in the near future to “Environmentally Critical” status, and the future land uses be changed to “Conservation Lands”. The preserve consists of six STRAP numbers: 10-45-22-00-00001.0000, 11-45-22-00-00001.0000, 15-45-22-00-00001.5000, 15-45-22-00-00001.3010, 15-45-22-00-00001.3030, and 15-45-22-00-00006.0000. For the preserve’s STRAP numbers, refer to Figure 25. Legal description can be found in Appendix F.

Figure 22: Acquisitions and Nominations Map

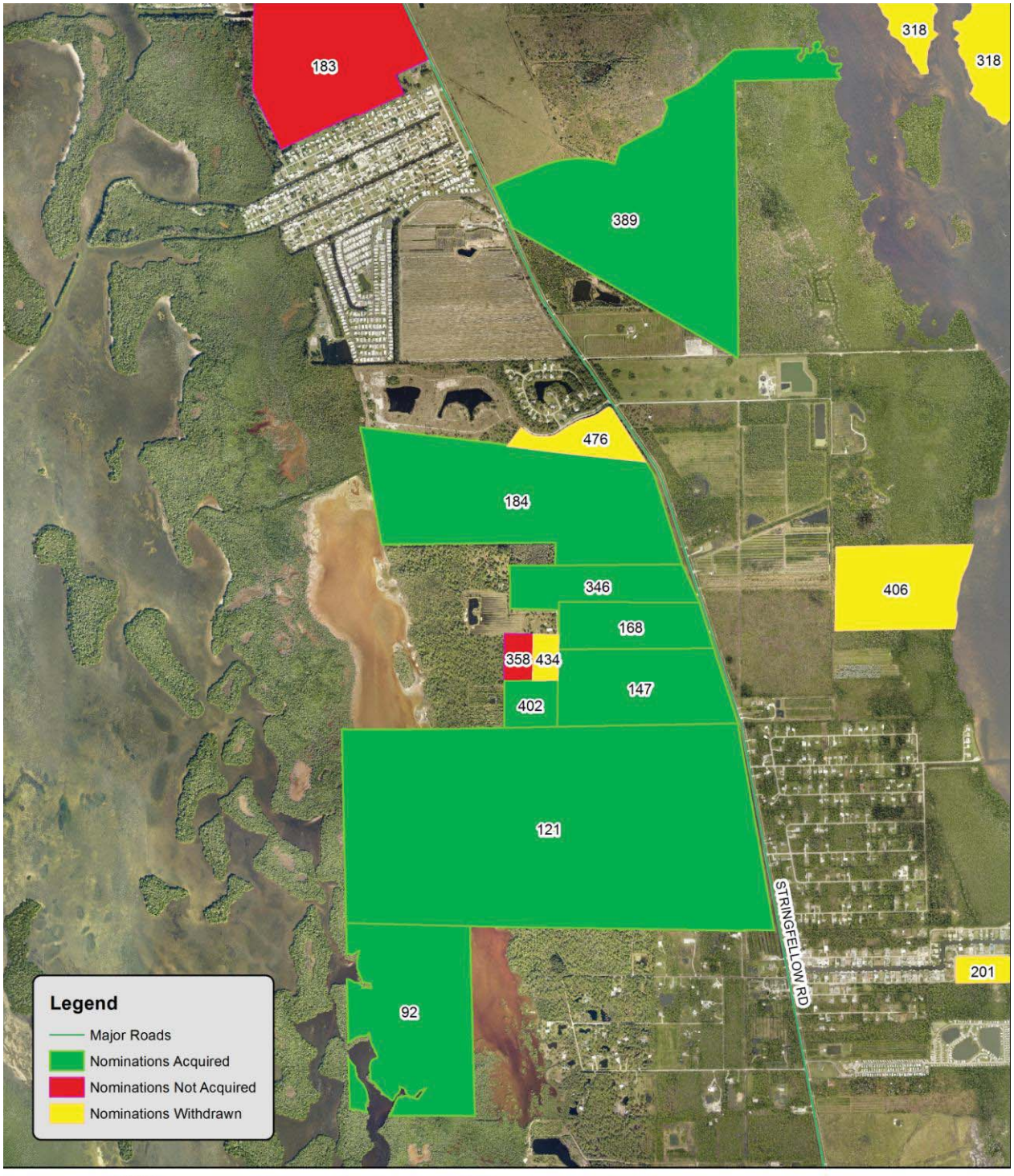


Figure 23: Zoning Map

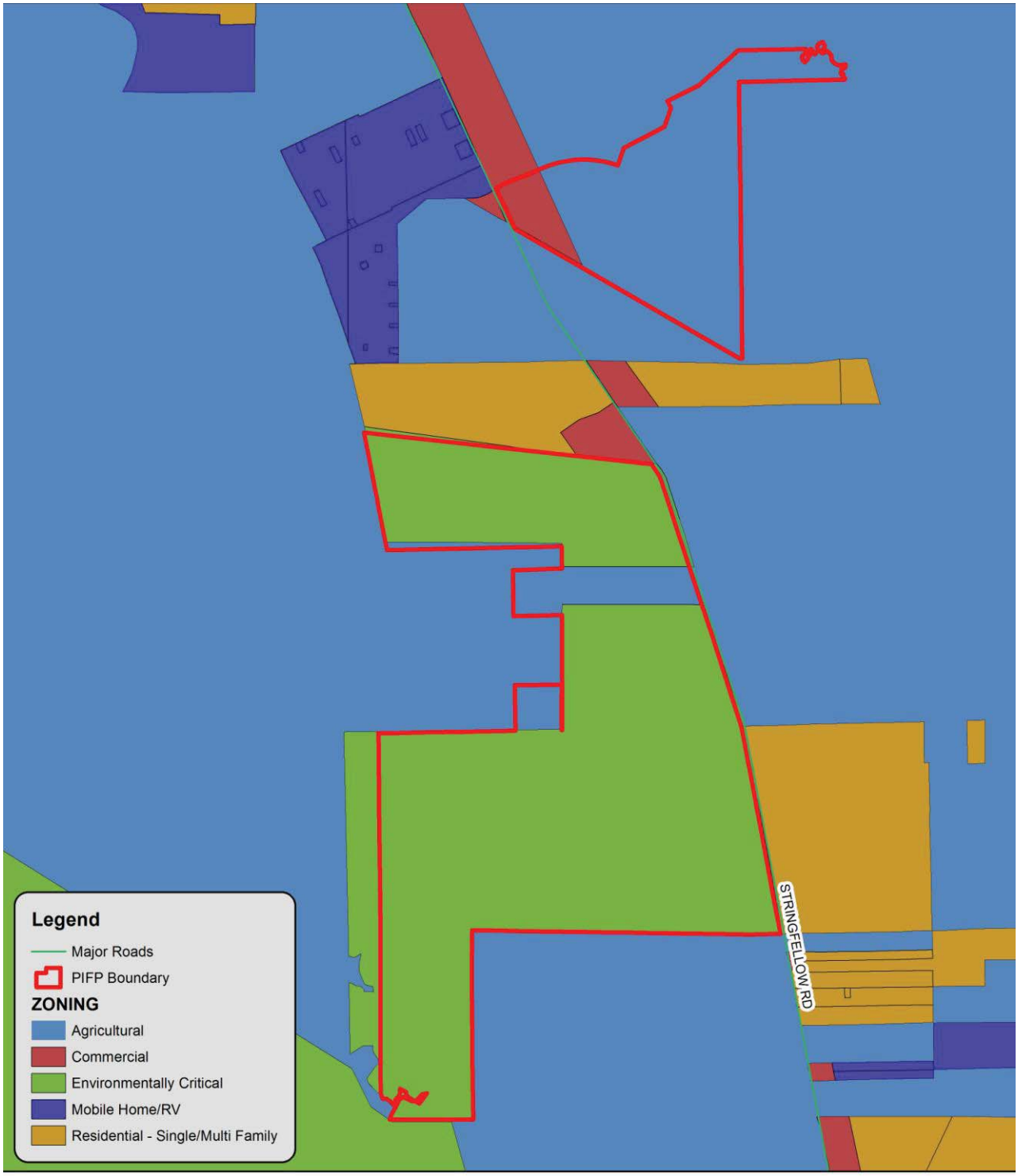


Figure 24: Future Land Use Map

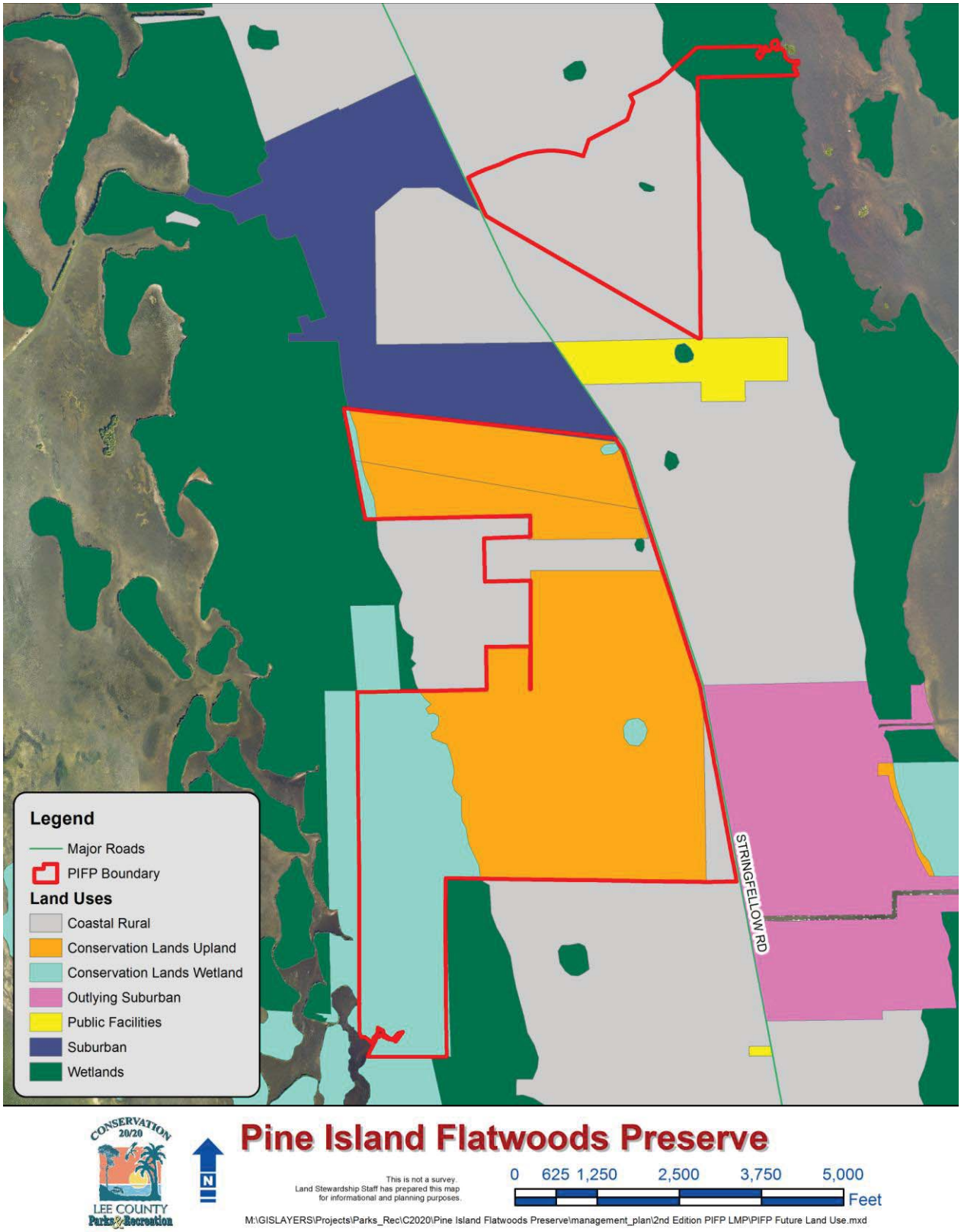
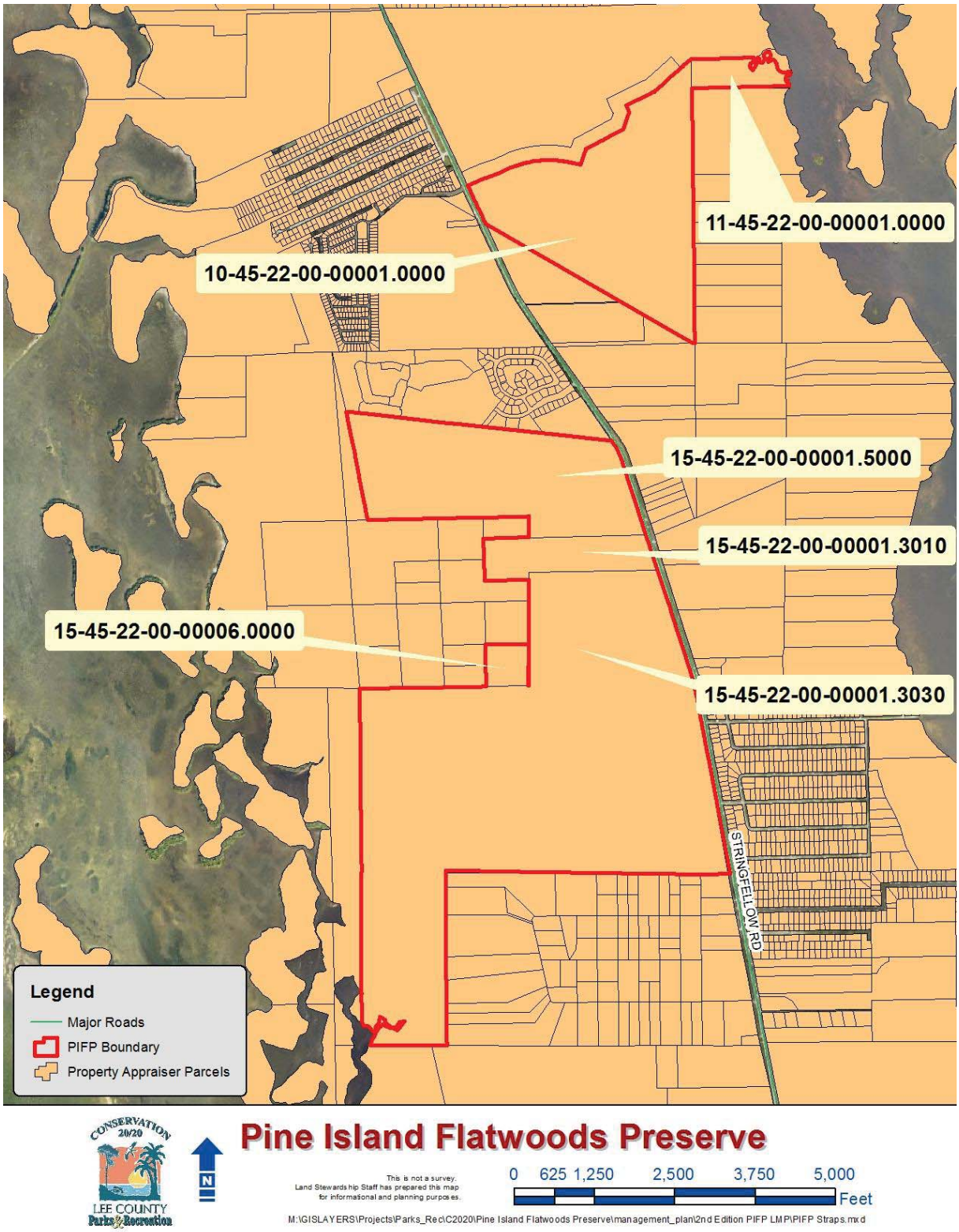


Figure 25: STRAP Numbers Map



VI. MANAGEMENT ACTION PLAN

A. Management Unit Descriptions

Pine Island Flatwoods Preserve has been divided into 15 management units to better organize and achieve management goals. Figure 26 delineates the management units that were created based on existing trails or plant communities. Some units may be further subdivided to create smaller burn units for prescribed fire.

- MU 1 – 35.3 acres

Located within acquisition 184 in the northwest corner of the preserve, this unit consists primarily of pine flatwoods with a small disturbed area in the northwest corner of the unit where a shrimp farm once existed. It is bordered to the north by private property, to the west by mangroves and coastline, to the east by MU 2, and to the south by MU 3. Management activities in this unit will focus on exotic plant control in the western disturbed portions, and prescribed fire in the eastern portions; past melaleuca treatments have been conducted in the flatwoods and will require future monitoring. This unit has an active cattle lease. Mechanical treatment by roller chopping was done on this unit in 2008 to reduce vegetation height and density and increase species diversity. This unit was also burned by a wildfire in July 2011.

- MU 2 – 28.9 acres

Located within acquisition 184 in the northeast corner of the preserve, this unit is primarily pine flatwoods with about 2 acres of hydric hammock. It is bordered by private property to the north, to the east by Stringfellow Road, MU 1 to the west, and MU 4 to the south. Management activities in this unit will focus on exotic plant control and prescribed fire in the eastern portions; past melaleuca treatments have been conducted in the flatwoods and will require future monitoring. This unit has an active cattle lease. Mechanical treatment by roller chopping was done on this unit in 2008 to reduce vegetation height and density and increase species diversity. This unit was also burned by a wildfire in July 2011.

- MU 3 – 49.5 acres

Located within acquisition 184 on the western border of the preserve, this unit primarily consists of improved pasture with isolated patches of coastal grasslands and pine flatwoods. It is bordered to the south by a monoculture of invasive exotic melaleuca and Australian pine trees on private property, to the west by mangroves and salt flats, to the north by MU 1, and to the east by MU 4. Management activities in this unit will focus on exotic plant control, including but not limited to: melaleuca, Brazilian pepper, and downy rose myrtle (*Rhodomyrtus tomentosa*). This unit has an active cattle lease, an active bald eagle nest in the western half of the site, and a portion of an effluent release system managed by

Pine Island Waste Water Treatment Facility throughout the eastern border zone. A portion of this unit was burned by a wildfire in July 2011.

- MU 4 – 34.3 acres

Located within acquisition 184 on the eastern border of the preserve, this unit primarily consists of improved pasture and isolated patches of pine flatwoods on the northern border. It is bordered to the south by MU 13, to the north by MU 2, to the west by MU 3, and to the east by Stringfellow Road. Management activities in this unit will focus on exotic plant control, including but not limited to: melaleuca, Brazilian pepper, and downy rose myrtle. This unit has an active cattle lease and the majority of an effluent release system managed by Pine Island Waste Water Treatment Facility. Mechanical treatment by roller chopping was done on this unit in 2010 to reduce vegetation height and density and increase species diversity.

- MU 5 – 20.9 acres

Located within acquisition 168 along the eastern border of the preserve, this unit consists primarily of pine flatwoods. It is separated from MU 4 by a newer acquisition which has interrupted the numeric order of the units but allowed the historic records for each labeled unit to remain consistent. This unit is bordered to the north by a private road easement (Monaco Lake Dr) and MU 13, to the east by Stringfellow Road, to the west by a distribution powerline and private property, and to the south by MU 6. The southern border of the unit also runs along an elevated farm road previously called Monaco Lake Drive; this road and associated resident access easement was relocated to the northern boundary of this management unit. Management activities in this unit will focus on exotic plant control and prescribed fire. This unit was rollerchopped and planted with longleaf pine seedlings in August 2011. This unit has been prescribed burned three times - 2007, 2009, and 2011. A small portion of this unit was burned by a wildfire in July 2014. After the initial prescribed fire, pine bark beetles caused high mortality in the slash pine trees. Because of the large amount of dead standing timber and to reduce further pine bark beetle spread, this unit was salvage logged in 2009 to remove much of the dead standing timber and the live trees that were negatively affected by the pine bark beetles.

- MU 6 – 81.7 acres

Located within acquisitions 147/168/402 on the eastern border of the preserve, this unit once contained a citrus grove prior to acquisition that later developed a significant Australian pine tree infestation. It now consists primarily of pine flatwoods, but has approximately 20 acres of disturbed area at the site of the previous citrus grove. This unit is bordered to the north by MU 5, to the east by Stringfellow Road, to the south by a distribution powerline as well as MU 8 and 9, and to the west by a distribution powerline and private property. The designated public parking area and hiking trailhead are located in the northeastern corner of this unit, just north of the citrus grove site. This unit also contains a majority of the 1.12 mile designated hiking trail system. Management activities in this unit

will focus on exotic plant control and prescribed burning. Mechanical treatment by roller chopping was done on this unit in 2010 to reduce vegetation height and density and increase species diversity. This unit has been prescribed burned two times in 2008 and 2011. The former citrus grove and Australian pine monoculture on the eastern portion of this unit was planted with slash pine in 2010. After the initial prescribed fire, pine bark beetles caused high mortality in the adult slash pine trees. Because of the large amount of dead standing timber and to reduce further pine bark beetle spread, this unit was salvage logged in 2009 to remove much of the dead standing timber and the live trees that were negatively affected by the pine bark beetles.

- MU 7 – 109.2 acres

Located within acquisition 121 on the western border of the preserve, this unit consists primarily of tidal swamps dominated by red mangroves (*Rhizophora mangle*) which populate a large tidally influenced area throughout the middle portion of the site. It is bordered to the west by mangrove and salt flats, to the north by private property, to the east by MU 8, and to the south by MU 12. Management activities in this unit are limited due to the open water and mangrove areas, but will focus on exotic plant control where possible. A portion of this unit was burned by a wildfire in 2009. Mechanical treatment by roller chopping was done on the upland portion of this unit in 2011 to reduce vegetation height and density and increase species diversity. This unit was prescribed burned in 2013.

- MU 8 – 108.3 acres

Located within acquisition 121 in the center of the preserve, this unit consists primarily of pine flatwoods with approximately 8 acres of hydric hammock. It is bordered to the south by private property, to the north by a property palm grove and MU 6, the east borders MU 9 and 10, and the west borders MU 7. Stewardship activities in this unit will focus on exotic plant control, including but not limited to removal of Brazilian pepper and melaleuca. A small portion of the designated hiking trail system cuts through the northeastern corner of this unit and will be managed in accordance with the main section of the trail system. Mechanical treatment by roller chopping was done on this unit in 2008 to reduce vegetation height and density and increase species diversity. The northeast quarter of this unit was roller chopped again in 2012 to improve gopher tortoise habitat. A wildfire burned across this unit in June 2009 in July 2014. After the initial wildfire, pine bark beetles caused high mortality in the slash pine trees. Because of the large amount of dead standing timber and to reduce further pine bark beetle spread, this unit was salvage logged in 2009 in the wildfire area to remove much of the dead standing timber and the live trees that were negatively affected by the pine bark beetles.

- MU 9 – 61.3

Located within acquisition 121 on the eastern border of the preserve, this unit consists primarily of pine flatwoods with a large central depressional marsh. It is

bordered to the north by a distribution powerline and MU 6, to the east by a transmission powerline and MU 11, to the south by MU 10, and to the west by MU 8. Management activities in this unit will focus on exotic plant control, and prescribed fire. A small portion of the designated hiking trail system cuts through the northwestern corner of this unit and will be managed in accordance with the main section of the trail system. This unit may be further subdivided to create smaller burn units for prescribed fire. Mechanical treatment by roller chopping was done on this unit in 2008 to reduce vegetation height and density and increase species diversity. This unit was roller chopped again in 2012 to improve gopher tortoise habitat. A wildfire burned across the southwest portion of this unit in June 2009 and another wildfire burned across the western portion of it in July 2014. After the initial wildfire, pine bark beetles caused high mortality in the slash pine trees. Because of the large amount of dead standing timber and to reduce further pine bark beetle spread, this unit was salvage logged in the wildfire area in 2009 to remove much of the dead standing timber and the live trees that were negatively affected by the pine bark beetles.

- MU 10 – 71.7

Located within acquisition 121 in the eastern portion of the preserve, this unit consists primarily of pine flatwoods. It is bordered to the north by MU 9, to the east by a transmission powerline and MU 11, to the south by private property, and to the west by MU 8. Management activities in this unit will focus on exotic plant control and prescribed fire. Mechanical treatment by roller chopping was done on this unit in 2008 to reduce vegetation height and density and increase species diversity. A wildfire burned across the northwest portion of this unit in June 2009. After the wildfire, pine bark beetles caused high mortality in the slash pine trees. Because of the large amount of dead standing timber and to reduce further pine bark beetle spread, this unit was salvage logged in the wildfire area in 2009 to remove much of the dead standing timber and the live trees that were negatively affected by the pine bark beetles.

- MU 11 – 14.2

Located within acquisition 121 on the eastern border of the preserve, this unit consists primarily of pine flatwoods. Since this unit takes the shape of a very narrow triangle, it does not have an identifiable northern boundary. It is bordered to the east by Stringfellow Road, to the south by private property, and to the west by a transmission powerline as well as MU 9 and 10. Management activities in this unit will focus on exotic plant control, including but not limited to melaleuca, and prescribed fire. Mechanical treatment by roller chopping was done on this unit in 2011 to reduce vegetation height and density and increase species diversity.

- MU 12 – 80.6 acres

Located within acquisition 092 on the western border of the preserve, this unit consists primarily of tidal swamp dominated by mangroves and approximately 9 acres of open water. It is bordered to the north by MU 7 and by the property

boundary to the east, west, and south. The lands adjacent to the south and west boundaries are state owned conservation land and the Pine Island Sound Aquatic Preserve. Management activities in this unit are limited due to the open water and mangrove areas, but will focus on exotic plant control where possible.

- MU 13 – 34.8 acres

Located within acquisition 346 on the eastern border of the preserve, this unit once contained a large palm tree nursery prior to acquisition that continued through a lease until 2012. Since the termination of that lease agreement, the site has been planted with slash pine tree seedlings to develop a pine flatwoods. It is bordered to the north by MU's 3&4, to the east by Stringfellow Road, to the west by private property, and to the south by the new route of Monaco Lake Drive and the associated resident access easement. Management activities in this unit will focus on exotic plant control and habitat restoration as the site transitions into a pine flatwoods. This unit also has an active cattle lease to help control the vegetation, particularly Bermuda grass, that quickly took over after the area was leveled and planted. Also within this unit is a storage barn, a pump house and two wells.

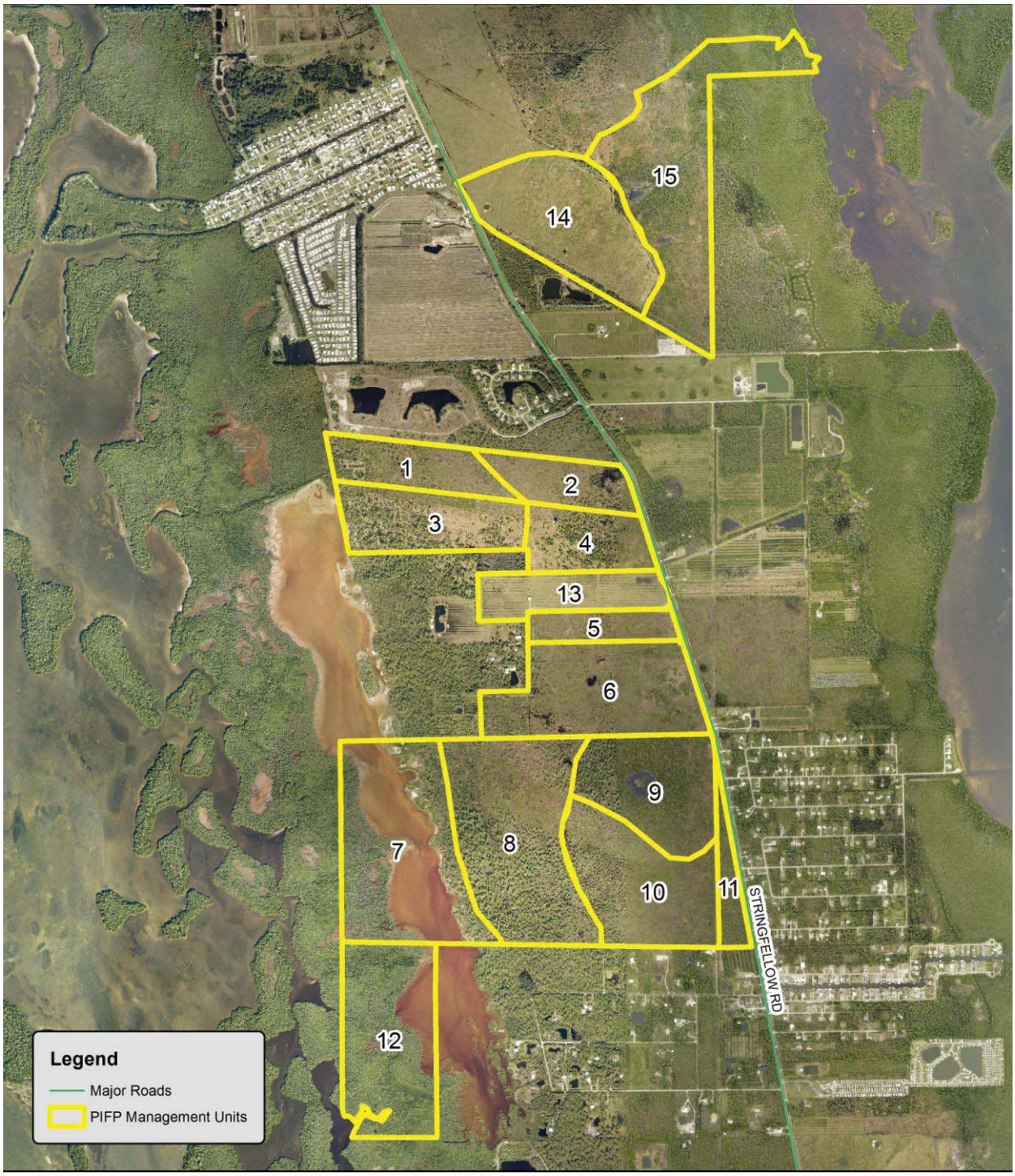
- MU 14 – 80.6 acres

Located within acquisition 389 to the northeast of the main preserve parcel, this unit consists of primarily improved pasture with mixed exotics. It is bordered to the north by the Conservation Foundation of the Gulf Coast property, a private conservation group, to the east by a ditch and MU 15, to the south by private property boundary and a drainage flow way, and to the west by a drainage flow way and Stringfellow Road. The lands adjacent to the north are owned by the private conservation group, Conservation Foundation of the Gulf Coast. Stewardship activities in this unit will focus on exotic plant control, habitat restoration, and prescribed fire. A large-scale restoration plan has been written to rehabilitate the unit, restore damages done by the cattle and agricultural use, and eliminate the invasive exotic plants found throughout the site.

- MU 15 – 111.2 acres

Located within acquisition 389 to the northeast of the main preserve parcel, this unit consists of both flatwoods and tidal swamp dominated by mangroves. It is bordered to the north by the CFGC property, CLT property and private property to the east, to the south by a drainage flow way, and to the west by a ditch and MU 14. Management activities in this unit will focus primarily in the scrubby flatwoods with exotic plant control, habitat restoration, and prescribed fire. A restoration plan is being written to rehabilitate the large wetland in the center of the unit. In 2012, this unit was logged to remove the large amount of melaleuca and Australian pine, and the slash pines were thinned.

Figure 26: Management Units



B. Goals and Strategies

The primary management objectives for PIFP are natural community enhancement, removal and continued treatment of invasive exotic plants, prescribed burning where appropriate and possible, and to continue to encourage public use through the allowable uses of the preserve. Although funding is currently not available to conduct all of these management activities, work at PIFP will be prioritized in order of importance and ease of accomplishment and include the following tasks. Grants and/or monies budgeted to mitigate public infrastructure projects will be used to supplement the operations budget to meet our goals in a timely manner.

Natural Resource Management

- ✓ Exotic plant control/maintenance
- ✓ Prescribed fire management
- ✓ Mechanical brush reduction
- ✓ Monitor and protect listed species
- ✓ Pine thinning
- ✓ Exotic and feral animal removal

Overall Protection

- ✓ Install/maintain fire breaks
- ✓ Boundary fence installation and interior fence removal
- ✓ Boundary sign maintenance
- ✓ Prevent dumping
- ✓ Encourage and monitor appropriate public use

Volunteers

- ✓ Assist volunteer group(s)

The following is a description of how each of these goals will be carried out, the success criteria used to measure accomplishment of each goal and a projected timetable outlining which units each activity will take place in and when.

Natural Resource Management

Exotic plant control and maintenance

The most current Florida Exotic Pest Plant Council's (FLEPPC) List of Invasive Species will be consulted in determining the invasive exotic plants to be controlled in each management unit. The goal is to remove/control these exotic species, followed with treatments of resprouts and new seedlings as needed. This goal will bring the entire preserve to a maintenance level, defined as less than 5% invasive exotic plant coverage.

Prior to each invasive exotic plant control project at PIFP that is performed by contractors, a Prescription Form (located in the LSOM) will be filled out by the

contractor(s), reviewed & approved by the land management staff. Final project information will be entered into the GIS database.

- Uplands with light to moderate infestations:

  In areas where invasive plants are sporadic and below 50% of the vegetation cover, hand removal will be utilized for control, while heavy equipment may be used in more densely infested areas. Specific methodology will depend on stem size, plant type and season, but generally the stem will be cut near the ground and the stump will be sprayed with appropriate herbicide, or a foliar application will be applied to the entire plant. Hand pulling will be utilized when possible with appropriate species in order to minimize herbicide use. Basal bark treatment may be used at some locations. Areas that receive heavy equipment work will receive follow-up treatment that will include an application of an appropriate herbicide mixture to the foliage of any resprouts or seedlings. Cut stems may be piled to facilitate future potential burning, chipping or removal from site. No replanting will be needed due to significant presence of native vegetation and the native seed bank. No debris will be piled in such a way as to block established flowways.

- Wetlands with light to moderate infestations:

  Hand crews will need to hike in and foliar, girdle, basal bark, or cut-stump treat the exotics with the appropriate herbicide. Follow-up treatments will need to be done on an annual basis and may eventually decrease to every two years. Where feasible or necessary, biomass may be removed from wetland sites to be piled and burned and/or mulched.

Prescribed fire management

A prescribed fire program is being implemented that as closely as possible mimics the natural fire regimes for the different plant communities to increase plant diversity and ensure tree canopies remain open. In management units that contain fire dependent communities, prescribed burns will be performed as site weather conditions allow. Prescribed fire may be utilized for exotic plant control of seedling/sapling in areas previously treated. These fire regimes have already been started in management units 5, 6 and 7.

With the daily sea breeze and the close proximity of several smoke sensitive areas, including neighbor's, residential structures, transmission power lines and major roads, burning opportunities are limited. When weather conditions are right, staff will close the public use amenities with very short notice. All designated access gates will be closed during the burn and may remain closed for several days afterwards during mop-up to ensure the site is safe for visitors.

The timing of prescribed burning will be influenced by seasonal rain, staff and equipment availability, listed species requirements, wind patterns and burn authorizations.

Due to a lack of a regular fire regime on the preserve in the past, the initial prescribed fires that are conducted will greatly stress the overstory pine trees. This is due to the lack of fire exposure throughout their lifetime as well as a very high density of trees per acre. As the trees are stressed, the pine bark beetles cause detrimental damage to the trees often resulting in tree mortality. Introducing fire into the system after fire has been excluded for long periods of time will often "reset the system", and results in a lot of overstory mortality. Staff has found this to be the case at the preserve and is working to slowly introduce fire into one management unit at a time so as to not create a setback of one type of habitat loss. With regular burning young pines will become acclimated to burning and have higher survival rates long-term.

Mechanical brush reduction

Lack of fire in PIFP has allowed saw palmetto to become thick and high. Mechanical work, including roller chopping and mowing, has been and will be continued to be used to reduce vegetation height which in turn will reduce fuel loads across the site. Mechanical work also encourages plant diversity with ultimate goal of allowing prescribed burning to take place. This is important for gopher tortoises and other native species.

Monitor and protect listed species

There are several listed species that have been documented on the preserve including gopher tortoise and bald eagles. These species will benefit from exotic plant control, prescribed burns, and low impact hydrological restoration activities. During management activities, efforts will be made to minimize negative impacts to listed species.

PIFP is part of a countywide tri-annual site inspection program conducted for all C20/20 preserves. The site inspection spreadsheet is available on the LCPR's computer server ("S" drive). These inspections allow staff to monitor for impacts and/or changes to each preserve and includes lists of all animal sightings and plant species that are found. If, during these inspections, staff finds FNAI listed species not previously documented, they will be reported using the appropriate forms.

Pine thinning

Some areas of PIFP will benefit from mechanical removal of select slash pines. The lack of fire and hydrologic changes at the site have allowed an unnaturally

high density of pines to occur in areas of the preserve which can be mechanically thinned and maintained with prescribed fire.
In the future as the slash pine density increases another timber harvest may be conducted to maintain open canopy. Funds from the timber sale will be used for management activities on the preserve.

Exotic and feral animal removal

Some exotic animal species have been recorded on PIFP. Although melaleuca psyllids and weevils are non-native animals, they are beneficial biological control agents targeting the invasive melaleuca tree. Staff is primarily concerned with the feral hog. Hogs currently are found occasionally on the preserve, but when signs are found, the county's hog trapper is notified so the hogs can be removed. Removing all hogs is an unreasonable goal; therefore a control program will need to be continuous on a long-term basis. If practical, a methodology will be established and implemented against other unwanted exotic animal species. Lee County has approved both contracted permit hunting and trapping as acceptable methods of hog removal on C20/20 preserves utilizing licensed contractors. The preserve will be closed to the public with access gates being locked during these hunts.

This preserve, like other C20/20 and county preserves, does not contain nor will it support feral cat colonies. FWC's Feral and Free Ranging Cats policy is *"To protect native wildlife from predation, disease, and other impacts presented by feral and free-ranging cats"* (FWC 2003). Any feral cats will be trapped and taken to Lee County Animal Services. C20/20 staff will work with the Animal Services staff to not locate feral cat colonies adjacent to the preserve.

Overall Protection

Install/maintain fire breaks

Perimeter fire breaks have been installed and are maintained twice annually by staff through either mowing or disking. The current public use trails are mowed and serve as non-disked fire breaks. When burns are planned the burn boss will evaluate the need for disking temporary lines. Wherever possible firebreaks will be installed on existing trails or other disturbed areas to minimize impact to plant communities and prevent water flow alteration.

Boundary fence installation and interior fence removal

The perimeter of the preserve is fenced to prevent activities such as dumping and the illegal use of motorized vehicles. As perimeter fence is replaced, new fence will include a middle strand of heavy gauge cable to deter fence cutting. The majority of interior fence has been removed. As land management activities occur, old fence is sometimes discovered and will be removed.

Boundary sign maintenance

Boundary signs have been installed along the entire perimeter boundary to further protect the preserve. The rangers and land management staff will check for boundary signs during their patrols and replace missing ones. Boundary signs have been placed every 500 feet on the preserve.

Prevent dumping

During tri-annual site inspections, any smaller objects that are encountered will be removed. C20/20 rangers will also assist with removing small items when they are on patrol at the preserve.

Volunteers
Assist volunteer group(s)

The LSOM identifies the Land Stewardship Volunteer Program's mission statement as:

> *To aid in the management and preservation of Lee County resource-based public parks and preserves and to provide volunteers with rewarding experiences in nature.*

Lee County Bird Patrol volunteer group perform bird monitoring surveys at PIFP on a monthly basis.

The members of the CLT assist in the management of the preserve through yearly work days and have provided funding to assist with parcel acquisition in the past.

If there is interest from the community to form a site specific volunteer group, staff will work with them to assist with the many diverse management activities that will be associated with this preserve, such as wildlife monitoring and other land management projects.

C. Management Work to Date

Since acquiring PIFP in 2000, it has undergone several large scale projects to bring it to its current state. Initially, approximately 100% of the preserve was covered in exotic invasive vegetation, including several large areas of melaleuca and Australian pine monocultures. Since 2005, numerous exotic plant treatments have been completed and the entire preserve is currently on a two year maintenance schedule. Treatments of all FLEEPC listed category I and II invasive exotic plants have been completed by both contractors and staff. There will be an indefinite need for ongoing exotic treatments due to the spread of invasive species like earleaf acacia and cogongrass that are currently showing up throughout the preserve. In addition to exotic plant and animal control, other projects completed included trash collection, posting boundary signs, installing fire breaks, re-introduction of prescribed fire, and interpretive and educational signs.

Prescribed burning to date has been initiated into MU 5, 6, and 7, but staff will continue to introduce fire into more units as conditions allow. Vegetation management has been a high priority to improve overall gopher tortoise habitat. Roller chopping projects have been completed in all upland MUs, some of which were partially grant funded by FWC. A salvage timber harvest was conducted after the 2009 wildfire in the burn areas of MU 5,6,7,8,9 and 10 to removed much of the pine bark beetle infested timber. The large melaleuca and Australian pine trees were removed from management unit 15 by timber harvest. The slash pine was also thinned during this project to lower the tree density.

Following prescribed burning and exotic plant removal staff conducted three planting projects. With the help of CLT volunteers, the eastern area of unit 6, formerly an Australian pine monoculture, was replanted with 200 slash pine trees. Additionally, due to slash pine loss from pine bark beetles, unit 5 was replanted with 12,000 long leaf pine seedlings in 2011. Because there is a large population of naturalized long leaf pine on Pine Island already, and Pine Island is the very southern extent of the range of this species, this was the selected species to replant in an effort to increase the number of long leaf pine on the preserve.

Formerly a palm grove until mid 2012, MU 13 was cleared of all palms, the irrigation piping was removed and the furrowed rows were leveled before being replanted with slash pine in January 2013. This 30 acre area was planted with 18,000 slash pine seedlings.

Along with the palm grove, Conservation 20/20 acquired a storage barn, a pump house and two wells in unit 13. The storage barn is currently being utilized by the maintenance staff on Pine Island as a storage and work facility, while the pump house was remodeled and converted to a storage shed. Of the two wells left at the site, a 4 inch well is used for garden hose water access and an 8 inch well was converted to a fire hose connection for water refill during prescribed

burning or wildfires for staff or the local fire department. The 8 inch well is also connected to a 2500 gallon water storage tank for an additional water supply.

Most recently, C20/20 staff has contracted a consultant to design restoration plans for MU 14 and 15 (see Appendix H). This restoration work is scheduled to begin in January 2017.

The following “Prioritized Projected Timetable for Implementation” is based on obtaining necessary funding for numerous land management projects. Implementation of these goals may be delayed due to changes in staff, extreme weather conditions or a change in priorities on properties managed by Lee County.

VII. PROJECTED TIMETABLE FOR IMPLEMENTATION

Management Activity	Jan-17	April-17	July-17	Oct-17	Jan-18	April-18	July-18	Oct-18	Jan-19	April-19	July-19	Oct-19	Jan-20	April-20	July-20	Oct-20	Jan-21	April-21	July-21	Oct-21	2022 or later
Natural Resource Management																					
Mechanical tree and brush reduction																					
Mechanical brush reduction	X				X				X				X				X				X
Pine tree thinning																					
Prescribed fire management																					
Install additional firelines									X												
Conduct prescribed burning	On-going	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Exotic plant control/maintenance																					
Follow-up treatment	On-going	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Habitat restoration																					
Pasture restoration	X	X	X	X																	
Maintenance (On-going/Annual)																					
Exotic animal removal	On-going	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Fire break mow/disk		X				X				X				X				X			X
Overall Protection																					
Trash removal	On-going	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Prevent dumping	On-going	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Boundary sign maintenance	On-going	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Change zoning categories									X												
Hiking trail install in MU 14, 15					X																
Volunteers																					
Assist volunteer group	On-going	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→

VIII. FINANCIAL CONSIDERATIONS

The Conservation 20/20 Program is funded by the Lee County's general fund in accordance with ordinance 06-26 (as amended). This annual allocation funds restoration, maintenance of the preserves, and C20/20 staff costs. Funds not used in the annual allocation rolls over to the following year for maintenance and restoration.

Other possible funding for exotic plant treatments and restoration projects may be requested through grants from agencies such as SFWMD, FDEP, FWC, and USFWS or include additional opportunities. Projected cost and funding sources are listed in Appendix I.

IX. LITERATURE CITED

Austin, R.J. 1987. An Archaeological Site Inventory and Zone Management Plan for Lee County, Florida. St. Petersburg: Piper Archaeological Research, Inc.

[CLTa] The Calusa Land Trust and Nature Preserve of Pine Island, Inc [CLT]. November 1998. The Nature Lover's Guide to Pine Island. Bokeelia, FL: Pine Island Printing. 131 p.

[CLTb] Calusa Land Trust [Internet]. c2002-2006 [cited 2006 February 22]. Available from: http://www.calusalandtrust.org/env.htm

Cook, R.E. 1945. "Geology of Florida." *In* Ecosystems of Florida (Myers & Ewel eds.). Orlando: University of Central Florida Press.

Cowardin LM, Carter V, Golet FC, LaRoe ET (Department of the Interior). 1979 December. Fish and Wildlife Service, Office of Biological Services.

Classification of Wetlands and Deepwater Habitats of the United States. Washington, D.C.: DOI. 131 p. Available from: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.; FWS/OBS-79/31.

[FCC] Florida Climate Center [Internet]. Tallahassee (FL): The Center for Ocean-Atmospheric Predictions Studies; 2005 [cited 2005 Aug 2]. Available from: http://www.coaps.fsu.edu/climate_center/nav.php.

[FDOT] Florida Department of Transportation. 1999 January. Florida Land Use, Cover and Forms Classification System. (3rd ed). Tallahassee: DOT, Surveying and Mapping Office.

[FLEPPC] Florida Exotic Pest Plant Council [Internet]. Ft. Lauderdale (FL): 2005 List of Florida's Invasive Species; 2005 [cited 2005 Oct 11]. Available from: http://www.fleppc.org/05list.htm

[FNAI & FDNR] Florida Natural Areas Inventory and Florida Department of Natural Resources. 2010. Guide to the Natural Communities of Florida. Tallahassee: FNAI & FDNR.

Gann, G.D., K.A. Bradley, and S.W. Woodmansee. 2002. Rare Plants of South Florida: Their History, Conservation, and Restoration. Institute for Regional Conservation. Miami, Florida.

Henderson, W.G. Jr. 1984. Soil Survey of Lee County, Florida. USDA Soil Conservation Service.

Hipes, D., Jackson D.R., NeSmith, K., Printiss D. and Brandt K. 2001. Field Guide to the Rare Animals of Florida. Tallahassee: Florida Natural Areas Inventory. 122 p.

(Lee County) Lee County Community Development. The Lee Plan 2004 Codification As Amended through December 2004 [Internet]. [cited 2005 September 7]. Available from: http://www.leecounty.com/dcd1/Leeplan/Leeplan.pdf

(Lee County) Lee County Parks and Recreation. Parks and Recreation Ordinance 02-12. 2002 [Internet]. [cited 2005 September 14]. Available from: http://www.lee-county.com/ordinances/PDF/2002/02-12.pdf

Missimer, T.M. and Thomas, S.M., editors. 2001. Geology and hydrology of Lee County, Florida. 9th Annual Southwest Florida Water Resources Conference; 1999 Nov 18 & 19; Ft. Myers (FL). Tallahassee: Florida Geological Survey. 230 p.

Myers, Ronald L., Ewel, J.H. (Eds.). 1990. Ecosystems of Florida. Orlando: University of Central Florida Press.

Postmus, B. 2003. Lee County Bird Patrol.

Printiss, David. 2003. “Fire and Isolated Wetlands”. Amphibians of Southeastern Ephemeral Wetlands, Gopher Tortoise Council Annual Meeting. Wekiwa Springs State Park, Apopka, Florida.

Save Florida’s Native Bromeliads: Conservation of Endangered Airplants Through Biological Control and Seed Collection [Internet]. Gainesville (FL): University of Florida Institute of Food and Agriculture Sciences. [cited 2004 Nov 8]. Available from: http://savebromeliads.ifas.ufl.edu.

[SFWMDa] South Florida Water Management District. Caloosahatchee Water Management Plan, Planning Document; April 2000 [cited 2005 Aug 15]. Available from: http://www.sfwmd.gov/org/exo/cwmp/final/cplan.pdf

[SFWMDb] South Florida Water Management District. District Water Management Plan 2000 (DWMP) [Internet]. [cited 2005 October 12]. Figure 8. Physiographic Regions within the SFWMD (Fernald and Purdam, 1998); p.17. Available from: http://www.sfwmd.gov/org/wrm/dwmp/dwmp_2000/dwmp1.pdf

Southeast Regional Climate Center [Internet]. Columbia (SC); [updated 2005 July 19; cited 2005 Aug 2]. Available from: sercc@dnr.state.sc.us.

Stubbs, S.A. 1940. “Solution a dominant factor in the geomorphology of peninsular Florida.” *In* Ecosystems of Florida (Myers & Ewel eds.). Orlando: University of Central Florida Press.

Tiner, Ralph W. 1998. In Search of Swampland, A Wetland Sourcebook and Fieldguide. New Brunswick, NJ: Rutgers University Press.

Wunderlin, Richard P. and Hansen, Bruce F. 2003. Guide to the Vascular Plants of Florida. Second Edition. Gainesville, FL: University Press of Florida.

X. APPENDICES

Appendix A: PIFP Soils Chart

Appendix B: Wildlife Species List

Appendix C: Plant Species List

Appendix D: Conservation Foundation Site Plan

Appendix E: Agreement with Lee County Utilities

Appendix F: Legal Description

Appendix G: Cattle Lease

Appendix H: PIFP-Bayside Restoration Plan

Appendix I: Expended and Projected Costs and Funding Sources

Appendix A: Summary of Soil Characteristics

							Biological Attributes				
Soil Types	**Total Acres**	**% of Preserve**	**Habitats (Range Site)**	**Wetland Class**	**Hydrologic Group**	**% Organic Matter**	**Potential as habitat for wildlife in-- Openland**	**Woodland**	**Wetland**	**Rangeland**	**Limitations for Recreational Paths & Trails**
Estero Muck	5.9	1%	salt water marsh	F	D	--	very poor	very poor	good	--	Severe: wetness, excess humus
Hallandale Fine Sand	21	2%	south florida flatwoods		B/D	2-5%	poor	poor	fair	poor	Severe: wetness, too sandy
Hallandale Fine Sand, Slough	39.3	4%	slough	S	B/D	1-2%	poor	poor	fair	poor	Severe: wetness, too sandy
Hallandale Fine Sand, Tidal	11.9	1%	salt water marsh	F	D	1-3%	very poor	very poor	poor	--	Severe: wetness, too sandy
Immokalee Sand	152.9	17%	south florida flatwoods		B/D	1-2%	poor	poor	poor	--	Severe: wetness, too sandy
Isle Fine Sand, Depressional	5.1	1%	freshwater marshes/ponds	P	D *	1-2%	very poor	very poor	good	--	Severe: wetness, too sandy
Myakka Fine Sand	467.8	51%	slough		B/D	<2%	fair	poor	poor	--	Severe: wetness, too sandy
Myakka Fine Sand, depressional	4.1	0%	fresh water marshes and ponds	P	D	1-2%	very poor	very poor	good	--	Severe: ponding, too sandy
Peckish Mucky Fine Sand	119	13%	salt water marsh	F	D	--	very poor	very poor	fair	--	Severe: wetness, too sandy
Pompano Fine Sand	20.1	2%	slough	S	B/D	1-5%	poor	poor	fair	--	Severe; wetness, too sandy
Smyrna Fine Sand	18.9	2%	south florida flatwoods		B/D	1-5%	fair	fair	fair	--	Severe: wetness, too sandy
Wulfert Muck	54.7	6%	salt water marsh		D	--	very poor	very poor	fair	--	Severe: wetness, excess humus

* Water table is above the surface of soil

Color Key:

Wet
Wetter
Wettest
Saturated

Appendix B: Wildlife Species List for Pine Island Flatwoods Preserve

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
MAMMALS				
Family: Didelphidae (opossums)				
Didelphis virginiana	Virginia opossum			
Family: Dasypodidae (armadillos)				
Dasypus novemcinctus	nine-banded armadillo *			
Family: Muridae (mice and rats)				
Oryzomys palustris	marsh rice rat			
Sigmodon hispidus	hispid cotton rat			
Family: Leporidae (rabbits and hares)				
Sylvilagus floridanus	eastern cottontail			
Family: Talpidae (moles)				
Scalopus aquaticus	eastern mole			
Family: Felidae (cats)				
Lynx rufus	bobcat			
Family: Procyonidae (raccoons)				
Procyon lotor	raccoon			
Family: Suidae (old world swine)				
Sus scrofa	feral hog *			
BIRDS				
Family: Anatidae (swans, geese and ducks)				
Subfamily: Anatinae				
Anas fulvigula	mottled duck			
Family: Ciconiidae (storks)				
Mycteria americana	wood stork	E	E	G4/S2
Family: Fregatidae (frigatebirds)				
Fregata magnificens	magnificent frigatebird			G5/S1
Family: Phalacrocoracidae (cormorants)				
Phalacrocorax auritus	double-crested cormorant			
Family: Anhingidae (anhingas)				
Anhinga anhinga	anhinga			
Family: Pelecanidae (pelicans)				
Pelecanus erythrorhynchos	American white pelican			
Pelecanus occidentalis	brown pelican	SSC		G4/S3
Family: Ardeidae (herons, egrets, bitterns)				
Ardea herodius	great blue heron			
Ardea alba	great egret			G5/S4
Egretta thula	snowy egret	SSC		G5/S3
Egretta caerulea	little blue heron	SSC		G5/S4
Egretta tricolor	tricolored heron	SSC		G5/S4
Egretta rufescens	reddish egret	SSC		G4/S2
Bubulcus ibis	cattle egret			
Family: Threskiornithidae (ibises and spoonbills)				
Subfamily: Threshiornithinae				
Eudocimus albus	white ibis	SSC		G5/S4
Plegadis falcinellus	glossy ibis			G5/S3
Subfamily: Plataleinae				
Ajaia ajaja	roseate spoonbill	SSC		G5/S2
Family: Cathartidae (new world vultures)				
Coragyps atratus	black vulture			
Cathartes aura	turkey vulture			
Family: Pandionidae (ospreys)				
Pandion haliaetus	osprey			G5/S3S4
Family: Accipitridae (hawks, kites, accipiters, harriers, eagles)				
Elanoides forficatus	swallow-tailed kite			G5/S2
Circus cyaneus	northern harrier			

Appendix B: Wildlife Species List for Pine Island Flatwoods Preserve

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
Accipiter cooperii	Cooper's hawk			
Hailaeetus leucocephalus	bald eagle	T		G5/S3
Buteo lineatus	red-shouldered hawk			
Buteo brachyurus	short-tailed hawk			G4G5/S1
Buteo jamaicensis	red-tailed hawk			
Family: Charadriidae (plovers)				
Subfamily: Charadriinae				
Pluvialis squatarola	black-bellied plover			
Charadrius vociferus	killdeer			
Family: Scolopacidae (sandpipers and phalaropes)				
Subfamily: Scolopacinae				
Actitis macularia	spotted sandpiper			
Tringa melanoleuca	greater yellowlegs			
Catoptrophorus semipalmatus	willet			
Tringa flavipes	lesser yellowlegs			
Calidris alpina	dunlin			
Calidris minutilla	least sandpiper			
Limnodromus griseus	short-billed dowitcher			
Family: Laridae (gulls)				
Subfamily: Larinae				
Larus atricilla	laughing gull			
Family: Columbidae (pigeons and doves)				
Zenaida macroura	mourning dove			
Columbina passerina	common ground-dove			
Family: Strigidae (true owls)				
Otus asio	eastern screech owl			
Bubo virginianus	great horned owl			
Family: Caprimulgidae (goatsuckers)				
Subfamily: Chordeilinae				
Chordeiles minor	common nighthawk			
Subfamily: Caprimulginae				
Caprimulgus carolinensis	chuck-will's-widow			
Family: Alcedinidae (kingfishers)				
Ceryle alcyon	belted kingfisher			
Family: Picidae (woodpeckers)				
Subfamily: Picinae				
Melanerpes carolinus	red-bellied woodpecker			
Picoides pubescens	downy woodpecker			
Picoides villosus	hairy woodpecker			G5/S3
Colaptes auratus	northern flicker			
Dryocopus pileatus	pileated woodpecker			
Family: Falconidae (falcons)				
Subfamily: Falconinae (falcons)				
Falco sparverius	American kestrel			
Falco columbarius	merlin			G5/S2
Family: Tyrannidae (tyrant flycatchers)				
Subfamily: Fluvicolinae				
Sayornis phoebe	eastern phoebe			
Myiarchus crinicensis	great-crested flycatcher			
Empidonax virescens	acadian flycatcher			
Family: Laniidae (shrikes)				
Lanius ludovicianus	loggerhead shrike			
Family: Vireonidae (vireos)				
Vireo griseus	white-eyed vireo			
Vireo solitarius	blue-headed vireo			

Appendix B: Wildlife Species List for Pine Island Flatwoods Preserve

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
Family: Corvidae (crows, jays, etc.)				
Cyanocitta cristata	blue jay			
Corvus brachyrhyncos	American crow			
Corvus ossifragus	fish crow			
Family: Hirundinidae (swallows)				
Subfamily: Hirundinidae				
Progne subis	purple martin			
Tachycineta bicolor	tree swallow			
Family: Troglodytidae (wrens)				
Troglodytes aedon	house wren			
Thryothorus ludovicianus	Carolina wren			
Family: Polioptilidae				
Polioptila caerulea	blue-gray gnatcatcher			
Family: Turdidae (thrushes)				
Turdus migratorius	American robin			
Family: Mimidae (mockingbirds and thrashers)				
Dumetella carolinensis	gray catbird			
Mimus polyglottos	northern mockingbird			
Family: Sturnidae (starlings)				
Sturnus vulgaris	European starling *			
Family: Bombycillidae (waxwings)				
Bombycilla cedrorum	cedar waxwing			
Family: Parulidae (wood-warblers)				
Mniotilta varia	black-and-white warbler			
Geothlypis tristis	common yellowthroat			
Setophaga ruticilla	American redstart			
Parula americana	northern parula			
Dendroica striata	blackpoll warbler			
Dendroica palmarum	palm warbler			
Dendroica pinus	pine warbler			
Dendroica coronata	yellow-rumped warbler			
Dendroica discolor	prairie warbler			
Family: Emberizine (sparrows and their allies)				
Pipilo erythrophthalmus	eastern towhee			
Family: Cardinalidae (cardinals, some grosbeaks, new world buntings, etc.)				
Cardinalis cardinalis	northern cardinal			
Family: Icteridae (blackbirds, orioles, etc.)				
Agelaius phoeniceus	red-winged blackbird			
Sturnella magna	eastern meadowlark			
Quiscalus quiscula	common grackle			
Quiscalus major	boat-tailed grackle			
REPTILES				
Family: Testudinidae (gopher tortoises)				
Gopherus polyphemus	gopher tortoise	T		G3/S3
Family: Polychridae (anoles)				
Anolis sagrei	brown anole *			
Family: Teiidae (whiptails)				
Cnemidophorus sexlineatus sexlineatus	six-lined racerunner			
Family: Scincidae (skinks)				
Eumeces fasciatus	five-lined skink			
Family: Colubridae (colubrids)				
Thamnophis sirtalis sirtalis	eastern garter snake			
Drymarchon corais couperi	eastern indigo snake	T	T	G3/S3
AMPHIBIANS				
Family: Leptodactylidae (tropical frogs)				

Appendix B: Wildlife Species List for Pine Island Flatwoods Preserve

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
Eleutherodactylus planirostris planirostris	greenhouse frog *			
Family: Bufonidae (toads)				
Bufo terrestris	southern toad			
Bufo quercicus	oak toad			
Family: Hylidae (treefrogs and their allies)				
Hyla cinerea	green treefrog			
Hyla femoralis	pine woods treefrog			
Hyla squirella	squirrel treefrog			
Osteopilus septentrionalis	Cuban treefrog *			
Pseudacris nigrita verrucosa	Florida chorus frog			
Family: Microhylidae (narrowmouth toads)				
Gastrophryne carolinensis	eastern narrowmouth toad			
Family: Ranidae (true frogs)				
Rana utricularia	southern leopard frog			
FISHES				
Family: Fundulidae (topminnows and killifishes)				
Fundulus grandis	gulf killifish			
Family: Cyprinodontidae (pupfishes)				
Cyprinodon variegatus	sheepshead minnow			
Family: Poeciliidae (livebearers)				
Poecilia latipinna	sailfin molly			
Gambusia spp.	mosquitofish			
MILLIPEDES				
Family: Spirobolidae (millipedes)				
Chicobolus spinigerus	Florida ivory millipede			
INSECTS				
Family: Curculionidae (true weevils)				
Oxyops vitiosa	melaleuca weevil *			
Family: Papilionidae (swallowtails)				
Eurytides marcellus	zebra swallowtail			
Family: Pieridae (whites and sulphurs)				
Subfamily: Pierinae (whites, marbles and orange tips)				
Ascia monuste	great southern white			
Family: Nymphalidae (brushfoots)				
Subfamily: Heliconiinae (longwings)				
Agraulis vanillae	gulf fritillary			
Subfamily: Nymphalinae (brushfoots)				
Junonia coenia	common buckeye			
Junonia evarete	mangrove buckeye			
Anartia jatrophae	white peacock			
Family: Psychidae (bagworm moths)				
Thyridopteryx ephemeraeformis	bagworm			
ARACHNIDS				
Family: Araneidae (orb weavers)				
Nephila clavipes	golden-silk spider			
HORSESHOE CRABS				
Family: Limulidae (horseshoe crabs)				
Limulus polyphemus	horseshoe crab			
CRUSTACEANS				
Family: Ocypodoidea (ghost and fiddler crabs)				
Subfamily: Ocypodinae (fiddler crabs)				
Uca stylifera	fiddler crab			

KEY:

FWC = Florida Fish & Wildlife Conservation Commission
FWS = U.S. Fish & Wildlife Service
E - Endangered
T - Threatened
SSC - Species of Special Concern

FNAI = Florida Natural Areas Inventory
G - Global rarity of the species
S - State rarity of the species
T - Subspecies of special population
1 - Critically imperiled
2 - Imperiled
3 - Rare, restricted or otherwise vulnerable to extinction
4 - Apparently secure
5 - Demonstratebly secure

*** = Non-native**

Appendix C: Plant Sightings at Pine Island Flatwoods Preserve

Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Family: Cladoniaceae (lichens)						
Cladonia spp.	reindeer moss	native				
Family: Blechnaceae (mid-sorus fern)						
Blechnum serrulatum	swamp fern	native				
Woodwardia virginica	Virginia chain fern	native			R	
Family: Dennstaedtiaceae (cuplet fern)						
Pteridium aquilinum var. *caudatum*	lacy bracken fern	native				
Family: Nephrolepidaceae (sword fern)						
Nephrolepis exaltata	Boston fern	native				
Nephrolepis multiflora	Asian sword fern	exotic				
Family: Osmundaceae (royal fern)						
Osmunda cinnamomea	cinnamon fern	native				
Family: Polypodiaceae (polypody)						
Phlebodium aureum	golden polypody	native				
Family: Psilotaceae (whisk-fern)						
Psilotum nudum	wisk-fern	native				
Family: Pteridaceae (brake fern)						
Acrostichum aureum	golden leather fern	native		T	R	
Acrostichum danaeifolium	giant leather fern	native				
Family: Thelypteridaceae (marsh fern)						
Thelypteris kunthii	southern shield fern	native				
Family: Vittariaceae (shoestring fern)						
Vittaria lineata	shoestring fern	native				
Family: Pinaceae (pine)						
Pinus elliottii	slash pine	native				
Pinus palustris	longleaf pine	native			I	
Family: Agavaceae (agave)						
Agave decipiens	false sisal	native				
Family: Alismataceae (water plantain)						
Sagittaria lancifolia	bulltongue arrowhead	native				
Sagittaria latifolia	duck potato	native			I	
Family: Arecaceae (palm)						
Phoenix reclinata	Senegal date palm	exotic				
Sabal palmetto	cabbage palm	native				
Serenoa repens	saw palmetto	native				
Family: Bromeliaceae (pineapple)						
Tillandsia balbisiana	northern needleleaf	native		T		
Tillandsia fasciculata var. densispica	cardinal airplant	native		E		
Tillandsia paucifolia	potbelly airplant	native				
Tillandsia recurvata	ballmoss	native				
Tillandsia setacea	southern needleleaf	native				
Tillandsia usneoides	spanish moss	native				
Tillandsia utriculata	giant airplant	native		E		
Family: Burmanniaceae (burmannia)						
Burmannia capitata	southern bluethread	native			R	
Family: Commelinaceae (spiderwort)						
Murdannia nudiflora	nakedstem dewflower	exotic				
Family: Cyperaceae (sedge)						
Bulbostylis stenophylla	sandyfield hairsedge	native				
Carex tribuloides	blunt broom sedge	native				
Cladium jamaicense	Jamaica swamp sawgrass	native				

Appendix C: Plant Sightings at Pine Island Flatwoods Preserve

Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Cyperus compressus	poorland flatsedge	native				
Cyperus croceus	Baldwin's flatsedge	native				
Cyperus esculentus	yellow nutgrass	exotic				
Cyperus flavescens	yellow flatsedge	native				
Cyperus haspan	haspan flatsedge	native				
Cyperus iria	ricefield flatsedge	exotic				
Cyperus leconti	Leconte's flatsedge	native				
Cyperus ligularis	swamp flatsedge	exotic				
Cyperus odoratus	fragrant flatsedge	native				
Cyperus ovatus	pinebarren flatsedge	native				
Cyperus polystachyos	manyspike flatsedge	native				
Cyperus pumilus	low flatsedge	exotic				
Cyperus retrorsus	pinebarren flatsedge	native				
Cyperus surinamensis	tropical flatsedge	native				
Eleocharis baldwinii	Baldwin's spikerush	native				
Eleocharis cellulosa	Gulf Coast spikerush	native				
Eleocharis flavescens	yellow spikerush	native				
Eleocharis geniculata	Canada spikerush	native				
Eleocharis nigrescens	black spikerush	exotic				
Fimbristylis autumnalis	slender fimbry	native				
Fimbristylis cymosa	hurricanegrass	native				
Fimbristylis dichotoma	forked fimbry	native				
Fimbristylis puberula	hairy fimbry	native				
Fimbristylis schoenoides	ditch fimbry	exotic				
Fimbristylis spadicea	marsh fimbry	native				
Fuirena breviseta	saltmarsh umbrellasedge	native				
Fuirena pumila	dwarf umbrellasedge	native			I	
Fuirena scirpoidea	southern umbrellasedge	native				
Kyllinga brevifolia	shortleaf spikesedge	exotic				
Kyllinga pumila	low spikesedge	native				
Lipocarpha micrantha	smallflower halfchaff sedge	native				
Rhynchospora colorata	starrush whitetop	native				
Rhynchospora divergens	spreakding beaksedge	native				
Rhynchospora fascicularis	fascicled beaksedge	native				
Rhynchospora fernaldii	Fernald's beaksedge	native			CI	
Rhynchospora filifolia	threadleaf beaksedge	native				
Rhynchospora globularis	globe beaksedge	native				
Rhynchospora intermedia	pinebarren beaksedge	native				
Rhynchospora inundata	narrowfruit horned beaksedge	native				
Rhynchospora microcarpa sensu lato	southern beaksedge	native			R	
Rhynchospora nitens	shortbeak beaksedge	native				
Rhynchospora plumosa	plumed beaksedge	native			R	
Scleria ciliata var. curtissii	Curtiss' nutrush	native				
Scleria georgiana	slenderfruit nutrush	native			I	
Scleria reticularis	netted nutrush	native			R	
Scleria verticillata	low nutrush	native				
Family: Eriocaulaceae (pipewort)						
Lachnocaulon anceps	whitehead bogbutton	native				
Syngonanthus flavidulus	yellow hatpins	native			R	
Family: Haemodoraceae (bloodwort)						
Lachnanthes caroliana	Carolina redroot	native				

Appendix C: Plant Sightings at Pine Island Flatwoods Preserve

Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Family: Hypoxidaceae (yellow stargrass)						
Hypoxis juncea	fringed yellow stargrass	native			R	
Family: Juncaceae (rush)						
Juncus marginatus	grassleaf rush	native			R	
Juncus megacephalus	bighead rush	native				
Juncus scirpoides	needlepod rush	native				
Family: Marantaceae (arrowroot)						
Thalia geniculata	alligator flag	native				
Family: Orchidaceae (orchid)						
Habenaria floribunda	toothpetal false reinorchid	native				
Spiranthes vernalis	spring ladiestresses	native			R	
Family: Poaceae (grass)						
Amphicarpum muhlenbergianum	blue maidencane	native				
Andropogon brachystachyus	shortspike bluestem	native				
Andropogon glomeratus var. glomeratus	bushy bluestem					
Andropogon glomeratus var. glaucopsis	purple bluestem	native			R	
Andropogon glomeratus var. pumilus	bushy bluestem	native				
Andropogon virginicus var. *glaucus*	chalky bluestem	native			R	
Andropogon virginicus var. virginicus	broomsedge bluestem	native				
Aristida patula	tall threeawn	native			R	
Aristida purpurascens var. purpurascens	arrowfeather threeawn	native			I	
Aristida purpurascens var. tenuispica	Hillsboro threeawn	native				
Aristida spiciformis	bottlebrush threeawn	native			R	
Aristida stricta	wiregrass	native				
Axonopus fissifolius	common carpetgrass	native				
Axonopus furcatus	big carpetgrass	native				
Cenchrus spinifex	coastal sandbur	native				
Coelorachis rugosa	wrinkled jointailgrass	native				
Cynodon dactylon	Bermudagrass	native				
Dactyloctenium aegyptium	Durban crowfootgrass	exotic				
Dicanthelium aciculare subsp. neuranthum	needleaf witchgrass	native				
Dicanthelium chamaelonche subsp. breve	witchgrass	native			R	
Dichanthelium strigosum	rough hair witch grass					
Dichanthelium dichotomum	cypress witchgrass	native				
Dicanthelium ensifolium subsp. ensifolium	cypress witchgrass	native			I	
Dichanthelium portoricense	hemlock witchgrass	native				
Dichanthelium sphaerocarpon	roundseed witchgrass	native				
Dichanthelium strigosum var. glabrescens	roughhair witchgrass	native				
Digitaria bicornis	Asia crabgrass	exotic				
Digitaria ciliaris	southern crabgrass	native				
Digitaria longiflora	Indian crabgrass	exotic				
Digitaria sanguinalis	southern crabgrass					
Distichlis spicata	saltgrass	native			R	
Echinochloa colona	jungle rice	exotic				
Eleusine indica	Indian goosegrass	exotic				
Eragrostis atrovirens	feather lovegrass	exotic				
Eragrostis elliottii	Elliott's lovegrass	native				
Eragrostis virginica	coastal lovegrass	native				
Eustachys petraea	pinewoods fingergrass	native				
Leptochloa fusca subsp. fascicularis	bearded sprangletop	native				
Muhlenbergia capillaris	hairawn muhly grass	native				

Appendix C: Plant Sightings at Pine Island Flatwoods Preserve

Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Panicum dichotomiflorum	fall panicgrass	native				
Panicum hians	gaping panicum	native				
Panicum hemitomon	maidencane	native				
Panicum maximum	Guineagrass	exotic	II			
Panicum repens	torpedograss	exotic				
Panicum rigidulum	redtop panicum	native				
Panicum tenerum	bluejoint panicum	native				
Paspalum monostachyum	gulfdune paspalum	native			R	
Paspalum nicorae	brunswickgrass	exotic				
Paspalum notatum var. saurae	bahiagrass	exotic				
Paspalum setaceum var. longipedunculatum	thin paspalum	native				
Paspalum setaceum var. stramineum	thin paspalum	native				
Paspalum urvillei	vaseygrass	exotic				
Paspalum vaginatum	seashore paspalum	native				
Rhynchelytrum repens	rose natalgrass	exotic				
Saccharum giganteum	sugarcane plumegrass	native				
Sacciolepis indica	Indian cupscale	exotic				
Sacciolepis striata	American cupscale					
Schizachyrium scoparium	little bluestem	native				
Setaria parviflora	knotroot foxtail	native				
Sorghastrum secondum	lopsided indiangrass	native				
Spartina bakeri	Sand cordgrass	native				
Sporobolus indicus	smutgrass	exotic				
Sporobolus virginicus	seashore dropseed	native				
Urochloa distachya	tropical signalgrass	exotic				
Family: Pontederiaceae (pickerelweed)						
Pontederia cordata	pickerelweed	native				
Family: Smilacaceae (smilax)						
Smilax auriculata	earleaf greenbrier	native				
Family: Typhaceae (cattail)						
Typha domingensis	southern cattail	native				
Family: Xyridaceae (yelloweyed grass)						
Xyris caroliniana	Carolina yelloweyed grass	native				
Xyris difformis	Florida yelloweyed grass	native			I	
Xyris elliottii	elliot's yelloweyed grass	native			R	
Xyris jupicai	Richard's yelloweyed grass	exotic				
Family: Acanthaceae (acanthus)						
Dyschoriste angusta	pineland twinflower	native				
Family: Aizoaceae (mesembryanthemum)						
Sesuvium portulacastrum	shoreline seapurslane	native				
Family: Amaranthaceae (amaranth)						
Blutaparon vermiculare	silverhead	native				
Sarcocornia perennis	perennial glasswort	native				
Suaeda linearis	sea linearis	native				
Family: Anacardiaceae (cashew)						
Rhus copallinum	winged sumac	native				
Schinus terebinthifolius	Brazilian pepper	exotic	I			
Toxicodendron radicans	eastern poison ivy	native				
Family: Annonaceae (custard-apple)						
Asimina reticulata	netted pawpaw	native				
Deeringothamnus rugelii var. pulchellus	pretty false pawpaw	native		E	CI	

Appendix C: Plant Sightings at Pine Island Flatwoods Preserve

Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Family: Apiaceae (carrot)						
Eryngium baldwinii	Baldwin's eryngo	native				
Ptilimnium capillaceum	mock bishopsweed	native				
Family: Apocynaceae (dogbane)						
Asclepias feayi	Florida milkweed	native				
Asclepias pedicellata	Savannah milkweed	native			I	
Catharanthus roseus	Madagascar periwinkle	exotic				
Sarcostemma clausum	white twinevine	native				
Family: Aquifoliaceae (holly)						
Ilex cassine	dahoon	native				
Family: Araliaceae (ginseng)						
Centella asiatica	spadeleaf	native				
Hydrocotyle umbellata	manyflower marshpennywort	native			R	
Schefflera actinophylla	Australian umbrella tree	exotic	I			
Family: Asteraceae (aster)						
Ambrosia artemisiifolia	common ragweed	native				
Baccharis angustifolia	saltwater falswillow	native				
Baccharis halimifolia	groundsel tree	native				
Bidens alba	beggerticks	native				
Borrichia frutescens	bushy seaside oxeye	native				
Carphephorus corymbosus	Florida paintbrush	native				
Cirsium nuttallii	Nuttall's thistle	native				
Conyza canadensis	Canadian horseweed	native				
Coreopsis leavenworthii	Leavenworth's tickseed	native				
Eclipta prostrata	false daisy	native				
Emilia fosbergii	Florida tassleflower	exotic				
Emilia sonchifolia	lilac tassleflower	exotic				
Erechtites hieraciifolius	fireweed	native				
Erigeron quercifolius	oakleaf fleabane	native				
Eupatorium capillifolium	dog fennel	native				
Eupatorium leptophyllum	falsefennel	native				
Eupatorium mikanioides	semaphore thoroughwort	native				
Eupatorium mohrii	Mohr's thoroughwort	native				
Eupatorium serotinum	lateflowering thoroughwort	native				
Euthamia minor	goldenrod	native				
Flaveria floridana	Florida yellowtops	native				
Flaveria linearis	narrowleaf yellowtops	native				
Gamochaeta falcata	narrowleaf purple everlasting	native				
Gamochaeta pensylvanicum	Pennsylvania everlasting	native				
Lygodesmia aphylla	rose-rush	native				
Mikania scandens	climbing hempvine	native				
Pityopsis graminifolia	narrowleaf silkgrass	native				
Pluchea carolinensis	cure-for-all	native				
Pluchea odorata	sweetscent	native				
Pluchea rosea	rosy camphorweed	native				
Pterocaulon pycnostachyum	blackroot	native				
Rayjacksonia phyllocephala	camphor daisy	native			I	
Solidago fistulosa	pinebarren goldenrod	native				
Solidago odora var. chapman	Chapman's goldenrod	native				
Solidago sempervirens	seaside goldenrod	native				
Sonchus asper	spiny sowthistle	exotic				

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Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Sonchus oleraceus	common sowthistle	exotic				
Vernonia blodgettii	Florida ironweed	native				
Family: Avicenniaceae (black mangrove)						
Avicennia germinans	black mangrove	native				
Family: Bataceae (saltwort)						
Batis maritima	saltwort	native			R	
Family: Boraginaceae (borage)						
Heliotropium angiospermum	scorpionstail	native				
Heliotropium polyphyllum	pineland heliotrope	native				
Family: Brassicaceae (mustard)						
Cardamine pensylvanica	Pennsylvania bittercess	native			R	
Family: Cactaceae (cactus)						
Opuntia stricta	erect pricklypear	native				
Family: Campanulaceae (bellflower)						
Lobelia feayana	bay lobelia	native			I	
Family: Caryophyllaceae (pink)						
Drymaria cordata	West Indian chickweed	native				
Family: Casuarinaceae (sheoak)						
Casuarina cunninghamiana	river sheoak	exotic				
Casuarina equisetifolia	Australian pine	exotic	I			
Family: Celastraceae (stafftree)						
Maytenus phyllanthoides	Florida mayten	native			R	
Family: Chrysobalanceae (coco plum)						
Licania michauxii	gopher apple	native				
Family: Cistaceae (rockrose)						
Lechea torreyi	piedmont pinweed	native			R	
Family: Clusiaceae (mangosteen)						
Hypericum brachyphyllum	coastalplain St. John's-wort	native				
Hypericum cistifolium	roundpod St. John's-wort	native				
Hypericum fasciculatum	peelbark St. John's-wort	native				
Hypericum tetrapetalum	fourpetal St. John's-wort	native				
Family: Combretaceae (combretum)						
Conocarpus erectus	buttonwood	native				
Laguncularia racemosa	white mangrove	native				
Terminalia catappa	West Indian almond	exotic				
Family: Convolvulaceae (morning glory)						
Ipomoea sagittata	saltmarsh morning-glory	native				
Family: Cucurbitaceae (gourd)						
Melothria pendula	creeping cucumber	native				
Momordica charantia	balsampear	exotic				
Family: Droseraceae (sundew)						
Drosera brevifolia	dwarf sundew	native				
Drosera capillaris	pink sundew	native			R	
Family: Ericaceae (heath)						
Bejaria racemosa	tarflower	native			R	
Gaylussacia dumosa	dwarf huckleberry	native				
Lyonia fruticosa	coastalplain staggerbush	native				
Lyonia lucida	fetterbush	native				
Vaccinium myrsinites	shiny blueberry	native				
Family: Euphorbiaceae (spurge)						
Chamaesyce blodgettii	limestone sandmat	native				

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Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Chamaesyce hypericifolia	graceful sandmat	native				
Chamaesyce hyssopifolia	hyssopleaf sandmat	native				
Cnidoscolus stimulosus	tread softly	native				
Croton glandulosus var. glandulosus	vente conmigo	native				
Euphorbia polyphylla	lesser Florida spurge	native				
Phyllanthus urinaria	chamber bitter	exotic				
Stillingia sylvatica	queensdelight	native				
Family: Fabaceae (pea)						
Acacia auriculiformis	earleaf acacia	exotic	I			
Acacia farnesiana	sweet acacia	native			R	
Acacia pinetorum	pineland acacia	native			I	
Aeschynomene americana	shyleaf	native				
Aeschynomene indica	Indian jointvetch	exotic				
Albizia julibrissin	mimosa	exotic	I			
Chamaecrista fasciculata	partridge pea	native				
Chamaecrista nictitans var. aspera	sensitive pea	native				
Crotalaria pallida	smooth rattlebox	exotic				
Crotalaria rotundifolia	rabbitbells	native				
Crotalaria spectabilis	showy rattlebox	exotic				
Dalbergia ecastaphyllum	coinvine	native				
Desmodium triflorum	threeflower ticktrefoil	exotic				
Galactia elliottii	Elliott's milkpea	native				
Leucaena leucocephala	white leadtree	exotic				
Mimosa quadrivalvis	sensitive brier	native				
Neptunia pubescens	tropical puff	native				
Sesbania herbacea	danglepod	native				
Vigna luteola	hairypod cowpea	native				
Family: Fagaceae (beech)						
Quercus elliottii	running oak	native				
Quercus geminata	sand live oak	native				
Quercus laurifolia	laurel oak	native				
Quercus minima	dwarf live oak	native			R	
Quercus virginiana	live oak	native				
Family: Gentianaceae (gentian)						
Sabatia brevifolia	shortleaf rosegentian	native			I	
Sabatia grandiflora	largeflower rosegentian	native				
Sabatia stellaris	Rose-of-Plymouth	native				
Family: Haloragaceae (watermilfoil)						
Proserpinaca palustris	marsh mermaidweed	native				
Proserpinaca pectinata	combleaf mermaidweed	native			R	
Family: Lamiaceae (mint)						
Hyptis alata	musky mint	native				
Piloblephis rigida	wild pennyroyal	native			R	
Family: Lauraceae (laurel)						
Cassytha filiformis	love vine	native				
Family: Lentibulariaceae (bladderwort)						
Pinguicula pumila	small butterwort	native			R	
Utricularia cornuta	horned bladderwort	native			R	
Utricularia foliosa	leafy bladderwort	native				
Utricularia purpurea	eastern purple bladderwort	native			R	
Utricularia simulans	fringed bladderwort	native				

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Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Utricularia subulata	zigzag bladderwort	native			R	
Family: Loganiaceae (logania)						
Mitreola sessilifolia	swamp hornpod	native				
Family: Lythraceae (loosestrife)						
Ammannia latifolia	pink restem	native			R	
Lythrum alatum	winged loosestrife	native				
Rotala ramosior	toothcup	native				
Family: Malvaceae (mallow)						
Melochia Spicata	bretonica peluda					
Sida acuta	common wireweed	native				
Sida rhombifolia	Cuban jute, Indian hemp	native				
Urena lobata	caesarweed	exotic	II			
Family: Martyniaceae						
Waltheria indica	Sleepy morning					
Family: Melastomataceae (melastome)						
Rhexia mariana	pale meadowbeauty	native			R	
Rhexia nuttallii	Nuttall's meadowbeauty	native				
Family: Myricaceae (bayberry)						
Myrica cerifera	wax myrtle	native				
Family: Myrsinaceae (myrsine)						
Rapanea punctata	myrsine	native				
Family: Myrtaceae (myrtle)						
Melaleuca quinquenervia	punktree	exotic	I			
Rhodomyrtus tomentosa	downy rose myrtle	exotic	I			
Syzygium cumini	java plum	exotic	I			
Family: Nymphaeaceae (waterlily)						
Nymphaea jamesoniana	nightblooming waterlily	native				
Family: Onagradeae (eveningprimrose)						
Gaura angustifolia	southern beeblossom	native				
Ludwigia curtissii	Curtiss' primrosewillow	native				
Ludwigia erecta	yerba de jicotea	native				
Ludwigia maritima	seaside primrosewillow	native				
Ludwigia microcarpa	smallfruit primrosewillow	native				
Ludwigia octovalvis	Mexican primrosewillow	native				
Ludwigia peruviana	Peruvian primrosewillow	exotic				
Ludwigia repens	creeping primrosewillow	native				
Family: Orobanchaceae (broomrape)						
Buchnera americana	American bluehearts	native				
Family: Oxalidaceae (woodsorrel)						
Oxalis corniculata sensu lato	common yellow woodsorrel	native				
Family: Passifloraceae (passionflower)						
Passiflora suberosa	corkystem passionflower	native				
Family: Phytolaccaceae (pokeweed)						
Phytolacca americana	American pokeweed	native				
Family: Plumbaginaceae (leadwort)						
Limonium carolinianum	Carolina sealavendar	native			R	
Family: Polygalaceae (milkwort)						
Polygala grandiflora	showy milkwort	native				
Polygala nana	candyroot	native			R	
Polygala rugelii	yellow milkwort	native			I	
Polygala setacea	coastalplain milkwort	native			I	

Appendix C: Plant Sightings at Pine Island Flatwoods Preserve

Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Family: Polygonaceae (buckwheat)						
Polygonum hydropiperoides	swamp smartweed	native				
Family: Portulacaceae (purslane)						
Portulaca pilosa	pink purslane	native				
Family: Rhizophoraceae (mangrove)						
Rhizophora mangle	red mangrove	native				
Family: Rubiaceae (madder)						
Chiococca alba	snowberry	native				
Diodia virginiana	Virginia buttonweed	native				
Galium hispidulum	coastal bedstraw	native				
Galium tinctorium	stiff marsh bedstraw	native				
Houstonia procumbens	roundleaf bluet	native				
Oldenlandia corymbosa	flattop mille graines	exotic				
Oldenlandia uniflora	clustered mille graines	native				
Randia aculeata	white indigoberry	native				
Richardia scabra	rough mexican clover	exotic				
Spermacoce assurgens	woodland false buttonweed	native				
Spermacoce verticillata	shrubby false buttonweed	native				
Family: Salicaceae (willow)						
Salix caroliniana	Carolina willow	native				
Family: Sapotaceae (sapodilla)						
Sideroxylon celastrinum	saffron plum	native				
Sideroxylon reclinatum	Florida bully	native				
Family: Solanaceae (nightshade)						
Lycium carolinanum	christmasberry	native				
Physalis angulata	cutleaf groundcherry	native				
Physalis angustifolia	coastal groundcherry	native				
Solanum americanum	American black nightshade	native				
Family: Turneraceae (turnera)						
Piriqueta cistoides	pitted stripeseed	native				
Family: Tetrachondraceae (tetrachondra)						
Polypremum procumbens	rustweed	native				
Family: Verbenaceae (vervain)						
Callicarpa americana	American beautyberry	native				
Phyla nodiflora	turkey tangle fogfruit	native				
Family: Veronicaceae (speedwell)						
Bacopa monnieri	herb-of-grace	native				
Gratiola hispida	rough hedgehyssop	native			R	
Gratiola ramosa	branched hedgehyssop	native			R	
Linaria canadensis	Canada toadflax	native			R	
Lindernia crustacea	Malaysian flase pimpernel	exotic				
Lindernia grandiflora	Savannah false pimpernel	native				
Scoparia dulcis	licoriceweed	native				
Family: Vitaceae (grape)						
Parthenocissus quinquefolia	Virginia creeper	native				
Vitis rotundifolia	muscadine	native				

Key

Florida EPPC Status

I = species that are invading and disrupting native plant communities
II = species that have shown a potential to disrupt native plant communities

FDACS (Florida Department of Agriculture and Consumer Services)

E = Endangered
T = Threatened
CE = Commercially Exploited

IRC (Institute for Regional Conservation)

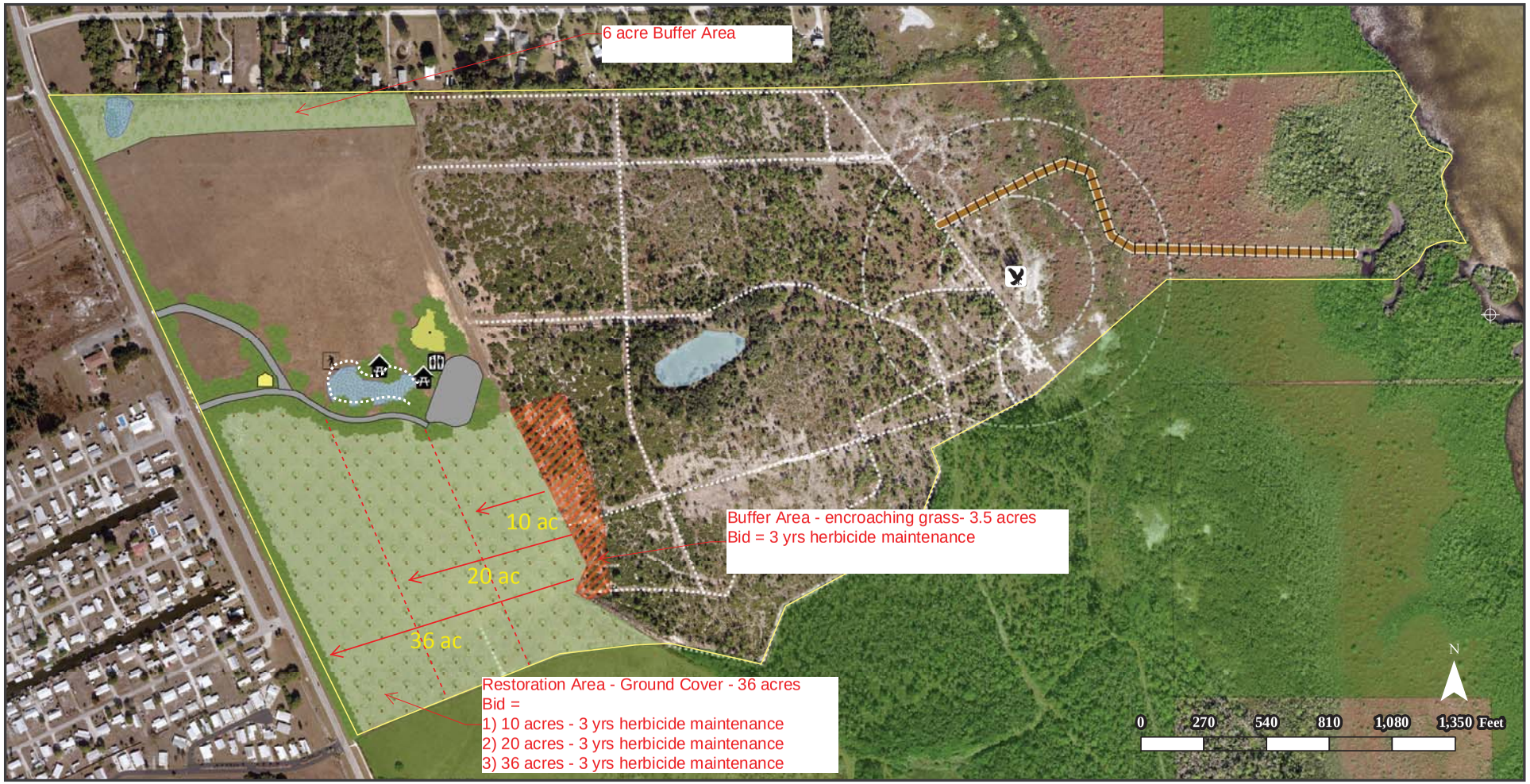
CI = Critically Imperiled
I = Imperiled
R = Rare

FNAI (Florida Natural Areas Inventory)

G= Global Status
T= Threatened
CE= Commercially Exploited

1= Critically imperiled because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerbility to extinction due to some natural or man-made factor.
2= Imperiled because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerbility to extinction due to some natural or man-made factor.
3= Either very rare and local throughout its range (21-200 occurences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
4= Apparently secure
5= Demonstrably secure

Appendix D: Conservation Foundation of the Gulf Coast Site Plan



PINE ISLAND PRESERVE AT MATLACHA PASS

DATE: July 17, 2015
SCALE: 1 inch = 424 feet

CONSERVATION FOUNDATION of the Gulf Coast
941.918.2100 www.conservationfoundation.com

Appendix E: Lee County Utilities Agreement

FINAL AGREEMENT

LEE COUNTY
SOUTHWEST FLORIDA

BOARD OF COUNTY COMMISSIONERS

Writer's Direct Dial Number: (941) 335-2236

John E. Manning
District One

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Andrew W. Coy
District Four

John E. Albion
District Five

Donald D. Stilwell
County Manager

James G. Yaeger
County Attorney

Diana M. Parker
County Hearing Examiner

September 15, 1999

Thomas G. Eckerty, Esq.
Attorney at Law
12734 Kenwood Lane, Suite 89
Fort Myers, Florida 33907-5638

RE: VILLAGE LINKS GOLF COURSE / LEE COUNTY UTILITIES / PINE ISLAND RECLAIMED WATER

Dear Tom:

I am providing you with an original, recorded Agreement between the County and the Village Links Land Trust in the above matter for your client's file.

Thank you and your client for your cooperation and patience in this matter.

Please advise if I can ever be of any service.

Cordially,

David M. Owen
Assistant County Attorney

DMO:dm
Enclosure
xc: James G. Yaeger, County Attorney **(w/o enclosure)**
Robert W. Gray, Deputy County Attorney **(w/o enclosure)**
J.W. French, P.E., Director, Public Works Administration **(w/o enclosure)**
Larry Johnson, P.E., Director, Environmental Services **(w/enclosure)**
Glenn Greer, P.E., Director, Lee County Utilities **(w/enclosure)**
Ivan Velez, P.E., Lee County Utilities **(w/enclosure)**

RECEIVED
SEP 16 1999
ENVIRONMENTAL SERVICES
THIRD FLOOR

P.O. Box 398, Fort Myers, Florida 33902-0398 (941) 335-2111
Internet address http://www.lee-county.com

INSTR # 4706842
OR BK 03162 PG 2595
RECORDED 08/31/99 12:50 PM
CHARLIE GREEN CLERK OF COURT
LEE COUNTY
RECORDING FEE 96.00
DEPUTY CLERK B Cruz

AGREEMENT FOR THE DELIVERY OF RECLAIMED EFFLUENT WATER

(UNIMPROVED PROPERTY)

THIS AGREEMENT is made and entered into on this 3rd day of August, 1999, by and between VILLAGE LINKS LAND TRUST, its assigns and/or successors in interest, hereinafter referred to as "TRUST", and LEE COUNTY, a political subdivision of the State of Florida, hereinafter referred to as "COUNTY"; collectively, "the Parties" hereto.

WITNESSETH:

WHEREAS, the COUNTY is in the process of permitting for the construction and operation of certain wastewater treatment facilities in Lee County on Pine Island, which will produce treated effluent water of a quality sufficient for the irrigation of grasses, woodlands, and certain crops; and

WHEREAS, as a condition of the permitting process for the COUNTY'S Pine Island Wastewater Treatment System and treated effluent water distribution ("System"), the Florida Department of Environmental Protection ("FDEP") has required that the COUNTY secure additional lands for treated effluent water disposal; and,

WHEREAS, the COUNTY desires to deliver treated effluent water for certain irrigation uses by others, as a means of treated effluent water disposal; and

WHEREAS, the COUNTY as part of the construction and operation of the System, will construct and utilize a reclaimed effluent water distribution system in order

VILLAGE.

that delivery of treated effluent water can be made to the TRUST property; and

WHEREAS, the COUNTY finds that it serves a public purpose to enter into this Agreement with the TRUST in order to further dispose of effluent water from its wastewater treatment facilities on Pine Island.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING AND THE MUTUAL COVENANTS CONTAINED HEREIN, THE TRUST AND THE COUNTY DO HEREBY AGREE AS FOLLOWS:

1. **LICENSE**

(a) The TRUST will grant to the COUNTY, a license for the construction, operation and maintenance of the delivery system for the placement of the reclaimed effluent water on the TRUST property. The License Agreement, and the legal description of the property subject to the License are incorporated herein and attached hereto as Exhibit A to this Agreement.

(b) Upon execution by both Parties to this Agreement, the entire Agreement, to include Exhibit A, shall be recorded in the appropriate record book in the Official Records of Lee County, Florida.

2. **TERM OF THE AGREEMENT**

The COUNTY shall deliver, and the TRUST shall accept, reclaimed effluent water produced by the COUNTY from its Pine Island Wastewater Treatment Facilities, once operational, for the term of this Agreement. This Agreement shall be effective for an initial term of ten (10) years from the date of this Agreement, or until such time as it is replaced by the "Subsequent Agreement" as contemplated at paragraph 16.; herein,

and may be extended beyond the initial term upon written amendment executed by both Parties hereto. This Agreement may be terminated for good cause shown by the TRUST or the COUNTY during the initial term, or during any subsequent term, upon written notice by the terminating party to the non-terminating party not less than one hundred eighty (180) days prior to any such termination. If the noticed, non-terminating party fails to cure or correct the matters in dispute during the one hundred eighty (180)-day notice period, this Agreement will be then terminated by the terminating party. This Agreement shall become effective as of the operational date for the Pine Island Wastewater Treatment Facilities.

3. **AUTHORIZATION FOR DELIVERY OF RECLAIMED WATER**

(a) The TRUST shall allow the COUNTY'S reclaimed effluent water to be delivered by the COUNTY to the TRUST property as designated herein. The COUNTY represents to the TRUST that said reclaimed effluent water shall be used by the COUNTY only for lawful purposes and that said use shall be at all times and in all manners, consistent with the provisions of this Agreement. COUNTY further represents to the TRUST that use of the reclaimed effluent water shall be consistent with all local, state and federal regulations, and shall be in such a manner so as not to require a federal wastewater discharge permit.

(b) The TRUST agrees to receive reclaimed effluent water within ten (10) days of receipt of written notice from the COUNTY that deliveries will commence from the Pine Island Wastewater Treatment Facilities.

delivery still do this?

4. **WATER QUALITY**

Reclaimed effluent water delivered under this Agreement shall be treated by the COUNTY to levels which meet all federal and state requirements for irrigation on lands with public access. Reclaimed effluent water shall be quality tested by the COUNTY at its source (the Pine Island Wastewater Treatment Plant) every month, and the results made available to the TRUST. In the event such testing reveals that the effluent water does not meet minimum local, state, or federal regulations, then the delivery of such effluent water will cease until such standards are met and certified to the TRUST.

5. **VOLUME OF WATER: DELIVERY SCHEDULE**

The COUNTY will deliver reclaimed effluent water, and the TRUST shall accept a volume of gallons of reclaimed water per day, not to exceed an application rate of 1.5 inches per week, and in any event, not to exceed 350,000 gallons per day, as requested and notified by the COUNTY. The COUNTY will install appropriate meters at the Point(s) of Delivery so that the volume of reclaimed effluent water delivered will be monitored. The COUNTY shall maintain the reclaimed effluent water distribution system on the TRUST property to include, but not be limited to: monitoring of flows and percolation rates so as to avoid ponding or odor on the TRUST property.

6. **POINT(S) OF DELIVERY**

The Point(s) of Delivery on the TRUST property shall be placed as authorized and designated by the TRUST. The COUNTY shall own and operate the reclaimed effluent water distribution system placed by the COUNTY on the TRUST property.

The COUNTY shall provide, in a manner approved by the appropriate regulatory

agencies, a positive check-valve between the reclaimed effluent water irrigation system and any other TRUST irrigation water source(s). The TRUST agrees to identify for the COUNTY, any well(s) that may be connected to the TRUST'S irrigation system when constructed. The TRUST may use any existing well(s) and/or lake or pond water source(s) for its future irrigation system, when appropriate permits are obtained and facilities constructed, provided that the two are not interconnected or operated simultaneously with the COUNTY'S reclaimed effluent irrigation system.

The COUNTY will construct, at its expense, all lines, meters, valves and other appurtenances necessary to extend the COUNTY'S reclaimed effluent water distribution system from existing COUNTY facilities to the TRUST property, and if requested by the TRUST, will promptly remove same from the TRUST property at COUNTY'S expense upon termination of this Agreement or as may be required for construction of the planned golf course development.

A breach of any of the terms or conditions of this paragraph 6., or paragraphs 4. or 5. above, shall constitute sufficient grounds for the termination of this Agreement by the TRUST upon one hundred eighty (180) days written notification of such termination provided to the COUNTY.

7. **EXCUSE FROM PERFORMANCE BY GOVERNMENTAL ACTS**

If for any reason during the term of this Agreement, Local, State or Federal governments or agencies shall fail to issue necessary permits, grant necessary approvals, or shall require any change in the operation of the treatment, transmission and distribution systems or the application and use of reclaimed effluent water, then to the extent that such requirements shall affect the ability of any Party to perform any of

the terms of this Agreement, the affected Party shall be excused from the performance thereof and a new Agreement may be negotiated by the Parties hereto in conformity with such permits, approvals, or requirements.

8. **INDEMNIFICATION**

(a) To the extent as provided for by law, in particular the terms and limitations as set out at Section 768.28, Florida Statutes, the COUNTY shall indemnify and hold harmless the TRUST, including its officers, directors, members, employees and agents, and any successors in interest or assigns, against any and all claims, actions, suits, proceedings, costs, expenses, including attorney's fees, damages or liabilities arising out of any injury, illness, or disease to persons or property alleged to have been caused directly or indirectly, in whole or in part, by the reclaimed effluent water as furnished by the COUNTY to the TRUST.

(b) The obligation of the COUNTY to indemnify the TRUST shall be conditioned upon the compliance of the TRUST with all regulatory agency requirements and regulations for the use of the reclaimed effluent water from any point(s) within the TRUST'S control, provided that such noncompliance with the said regulations by the TRUST, is the proximate cause of the alleged injury, illness or disease to any persons or to property.

(c) The TRUST shall save and hold harmless and indemnify the COUNTY, its agents, representatives, servants and employees, from any and all claims, costs, penalties, suits at law or in equity or administrative actions, damages and expenses (including attorney's fees) arising out of the following:

1. claims related to any of the TRUST'S construction, erection,

location, operation, maintenance, repair, installation, replacement or removal of any part of the reclaimed effluent water distribution system controlled by the TRUST; and,

2. claims arising out of the TRUST'S negligence or omissions with respect any to reclaimed effluent water distribution upon any areas owned, controlled, operated, or maintained by the TRUST, other than the area that is the subject of this Agreement as designated in Exhibit A, hereto.

9. **CHARGES AND RELATED CONSIDERATIONS**

As consideration for the TRUST allowing reclaimed effluent water from the COUNTY to be placed on the TRUST property as further described herein, and specifically for the term of this Agreement, the TRUST will not be charged by the COUNTY for any reclaimed water delivered to the TRUST undeveloped property. As further consideration, the COUNTY will reserve the first 350,000 gallons per day of reclaimed effluent water from the COUNTY Pine island Wastewater Treatment System for irrigation use at the proposed golf course development on the TRUST property.

10. **ACCESS**

The COUNTY shall have the right at any reasonable time and upon reasonable notice to the TRUST in advance, to enter upon the TRUST property to review, inspect, maintain and operate the COUNTY'S effluent distribution equipment on the TRUST property.

Such entry shall normally be for the purpose of review of the operation of the

reclaimed effluent water irrigation system, for inspection of COUNTY-owned mains and appurtenances, regular maintenance, and for sampling of any monitoring wells located on the TRUST property. The TRUST has the option of having a TRUST representative accompany the COUNTY'S personnel when on the TRUST property. All such on-site monitoring in any manner will be at COUNTY'S expense.

11. **DISCLAIMER OF THIRD PARTY BENEFICIARIES**

This Agreement is solely for the benefit of, and is binding upon the Parties hereto, their heirs, successors in interest or assigns, and no right or cause of action shall accrue upon or by reason hereof, to or for the benefit of any third party not a party hereto.

12. **SEVERABILITY**

If any part of this Agreement is found invalid or unenforceable by any court of competent jurisdiction, such invalidity or unenforceability shall not affect the other parts of this Agreement if the rights and obligations of the Parties contained therein are not materially prejudiced and if the intentions of the Parties can continue to be effected. To that end, this Agreement is declared to be severable.

13. **LAND USE APPROVALS**

This Agreement shall not be construed as any basis for (1) granting or assuring or indicating, or (2) denying, refusing to grant, or preventing, any future grant of land use or zoning approvals, permissions, variances, special exceptions, or rights with respect to the real property in the irrigated area.

14. **APPLICABLE LAW**

This Agreement and the provisions contained herein shall be construed, controlled, and interpreted according to the laws of the State of Florida.

15. **NOTICES**

All notices required or authorized under this Agreement shall be given in writing and shall be served by mail on the Parties at the addresses below:

FOR THE COUNTY:
A. GLENN GREER, P.E., DIRECTOR
LEE COUNTY UTILITIES DEPARTMENT
Post Office Box 398
Fort Myers, FL 33902-0398

FOR THE TRUST:
JAMES R. HIIRONEN
4099 Tamiami Trail, North, Suite 305
Naples, Florida 33940

16. **SUBSEQUENT AGREEMENTS**

The Parties recognize that this Agreement is for the delivery of reclaimed effluent water to the TRUST'S unimproved lands at this time, and that it is the expressed intent and agreement of the Parties that a Subsequent Agreement will be negotiated and entered into by the Parties for the delivery of COUNTY reclaimed effluent water to the TRUST'S improved property, at the time of development. In furtherance of that purpose, the Parties specifically agree to meet, negotiate and enter into a Subsequent Agreement for the delivery of reclaimed water to the TRUST'S improved property, one hundred eighty (180) days prior to the commencement of construction for the initial phase(s) of the "Village Links" golf course and residential community (or any successor community), on Pine Island. The Parties further agree that this provision constitutes a binding obligation for the COUNTY to deliver, and the TRUST to accept, reclaimed effluent water for its golf course facilities at "Village Links" from the COUNTY'S Pine Island Wastewater Treatment Facilities pursuant to the terms and conditions of a Subsequent Agreement.

The Parties further agree that certain terms and conditions exist between the

Parties for the subsequent Agreement to be finalized when the TRUST commences construction of the "Village Links" Golf Course and Community (or successor Development). Such agreed to terms and conditions are as follows:

1. Lee County, at its sole cost and expense, will construct, own and maintain all treated wastewater effluent lines up to the "Point of Delivery" on the TRUST'S property for the delivery of treated effluent from the COUNTY'S System to the TRUST'S residential and golf course community for the TRUST'S irrigation purposes.

2. The TRUST shall bear no cost or expense for the construction or maintenance of the COUNTY'S treated wastewater effluent lines up to the "Point of Delivery" on the TRUST'S property, nor shall the TRUST be liable for any COUNTY special assessments or other financing mechanisms for the COUNTY'S construction or operation of the System's treated effluent lines. However, this provision specifically does not apply to the COUNTY'S levy of any special assessments or other financing mechanisms for any System wastewater force mains, collection lines or gravity collection systems which may be developed by the County for the connection of the TRUST property development to the COUNTY'S System for wastewater treatment and disposal.

3. At the time of the development of the TRUST property, the TRUST shall, at its sole cost and expense, construct on its property, an isolated holding pond, pump station(s) and all necessary lines and related apparatus for the TRUST'S internal distribution of the treated wastewater effluent within the TRUST property for its use for irrigation purposes of its property.

4. Upon the connection of the TRUST'S "Village Links" Golf Course and Residential Development (or its successor Development) to the COUNTY'S effluent re-use lines at the Point of Delivery, the TRUST shall then be charged by Lee County for its use of the System treated effluent for irrigation, consistent with the then-existing rates for such effluent use pursuant to COUNTY Resolution.

17. **EXHIBITS**

This Agreement incorporates the following exhibit which is specifically made a part of this Agreement:

Exhibit A: DELIVERY OF RECLAIMED EFFLUENT WATER LICENSE

IN WITNESS WHEREOF, this Agreement with its attached Exhibit A, constitutes the entire Agreement between the Parties for this particular effluent disposal arrangement and has been entered into voluntarily and with the independent advice of legal counsel, and has been executed by the authorized representative of each Party on the date first written above. Any modifications to or waivers of the provisions herein shall only be made in writing, by the Parties hereto.

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF:

WITNESS:

Deborah K. Lewis
1st Witness

Brenda Lawmaster
2nd Witness

VILLAGE LINKS LAND TRUST

By: Thomas G. Eckerty

Trustee
Title

STATE OF FLORIDA)
) SS:
COUNTY OF LEE)

The foregoing instrument was signed and acknowledged before me this 29th day of Jan., 1999 by THOMAS G. ECKERTY
(Print or Type Name)
who has produced PERSONALLY KNOWN
(Type Of Identification and Number)
as identification, and who (did) (did not) take an oath.

Deborah K. Lewis
Notary Public Signature

DEBORAH K. LEWIS
Printed Name of Notary Public

CC517207
Notary Commission Number

(NOTARY SEAL)
NOTARY PUBLIC
OFFICIAL NOTARY SEAL
DEBORAH K LEWIS
COMMISSION NO. CC517207
MY COMMISSION EXP. DEC. 11,1999

ATTEST: CHARLIE GREEN
CLERK OF THE COURTS

By: _____
Deputy Clerk

LEE COUNTY, BY AND THROUGH ITS
BOARD OF COUNTY COMMISSIONERS

By: _____
Chairman or Vice Chairman

APPROVED AS TO FORM:

By: _____
Office of County Attorney

VILLAGE.

EXHIBIT A
GRANT OF LICENSE FOR DELIVERY OF RECLAIMED EFFLUENT WATER

VILLAGE LINKS LAND TRUST, whose mailing address is 4099 Tamiami Trail, North, Suite 305, Naples, Florida 33940, hereinafter referred to as "GRANTOR," in consideration of the mutual benefits to be derived, hereby grants and sets over to the COUNTY OF LEE, a political subdivision of the State of Florida, with its mailing address being Post Office Box 398, Fort Myers, Florida 33902-0398, hereinafter referred to as "GRANTEE," a license for the use and benefit of the Lee County Utilities Division for the delivery and distribution of reclaimed effluent water by spray irrigation, and the use of public utility facilities and equipment in connection with the delivery and distribution of said reclaimed effluent water, through and across certain real property located in Lee County, Florida, being more particularly described in Figures A-1 and A-2, attached hereto and made a part hereof.

This is a non-exclusive License Agreement with the GRANTOR reserving unto itself, and its successors or assigns, the right to the continued free use, access and enjoyment of the property herein described, for any purposes which are not inconsistent or restrictive of the rights and uses granted herein unto the GRANTEE.

At such time as the facilities of GRANTEE are removed or abandoned, this license shall be extinguished and all rights granted herein shall revert to the GRANTOR, its heirs, successors, or assigns.

VILLAGE.

IN WITNESS WHEREOF, the GRANTOR, has caused these presents to be duly executed this 29th day of Jan., 1999

WITNESS:

Deborah K. Lewis
1st Witness

Brenda Lawnsdale
2nd Witness

VILLAGE LINKS LAND TRUST

By: Thomas G. Eckerty

Trustee
Title

STATE OF FLORIDA)
) SS:
COUNTY OF LEE)

The foregoing instrument was signed and acknowledged before me this 29th day of Jan, 1999 by THOMAS G. ECKERTY
(Print or Type Name)
who has produced PERSONALLY KNOWN
(Type Of Identification and Number)
as identification, and who (did) (did not) take an oath.

Deborah K. Lewis
Notary Public Signature

DEBORAH K. LEWIS
Printed Name of Notary Public

CC517207
Notary Commission Number

(NOTARY SEAL)
NOTARY PUBLIC
STATE OF FLORIDA
OFFICIAL NOTARY SEAL
DEBORAH K LEWIS
COMMISSION NO. CC517207
MY COMMISSION EXP DEC. 11,1999

VILLAGE.

EXHIBIT A
FIGURE A-1

DESCRIPTION

VILLAGE LINKS LAND TRUST

VILLAGE.

COMPOSITE

EXHIBIT "A"

Description of a Parcel of Land
Lying in
Section 15, T-45-S, R-22-E
Pine Island, Lee County, Florida
(Michael Parcel)
(North Remainder Parcel)

A parcel of land situated in the State of Florida, County of Lee, lying in Section 15, Township 45 South, Range 22 East, and further bounded and described as follows:

Starting at the northwest corner of said Section 15; thence S12°40'58"E for 1241.75 feet; thence S9°57'43"E for 510.28 feet to the northwest corner of a parcel recorded in Official Records Book 1288 at Page 2322 and the Point of Beginning; thence S80°16'46"E along the north line of said parcel for 4418.79 feet to the southwesterly right-of-way line of Pine Island Boulevard (S. R. 767 - 100 feet wide); thence S17°24'17"E along said right-of-way line for 467.48 feet; thence S89°26'26"W for 1829.86 feet to a concrete post marking the east line of the southwest one quarter (SW 1/4) of said Section 15; thence N00°28'31"E along said east line for 329.59 feet to a concrete post marking the northeast corner of said fraction; thence S89°23'55"W along the south line of the northwest one quarter (NW 1/4) of said section for 2509.02 feet to a concrete monument marking the southwest corner of said parcel recorded in Official Records Book 1288 at Page 2322; thence N09°57'43"W along the westerly line of said parcel for 920.67 feet to the Point of Beginning.

Bearings are based on the east line of the southwest one quarter (SW 1/4) of said Section 15 as bearing N00°28'31"E.

A parcel of land in Section 35, Township 45 South, Range 22 East, further described as follows: Begin at a concrete monument at the Northwesterly corner of St. Jude Harbors, a subdivision recorded in Plat Book 16, page 141, Lee County, Florida, thence North 11 degrees 43'15" West 335.08 feet along the easterly right of way line of Pine Island Boulevard (50 feet from centerline), thence North 89 degrees 07' East 397 feet, more or less to the waters of a tidal canal, thence southeasterly along the waters of said canal a distance of 335.08 feet, more or less, to a point North 89 degrees 07' East of the Point of Beginning. Thence South 89 degrees 07' West 397 feet, more or less to the Point of Beginning.

LOTS 5, 6 AND 7, AND TRACT A, BLOCK 2, UNIT 1, ST. JUDE HARBORS SUBDIVISION, AS RECORDED IN PLAT BOOK 16, PAGE 141, PUBLIC RECORDS OF LEE COUNTY, FLORIDA.

EXHIBIT A
FIGURE A-2

Description of license area to Lee County for Operation and Maintenance of a Treated Effluent Water Spray Irrigation System:

VILLAGE.

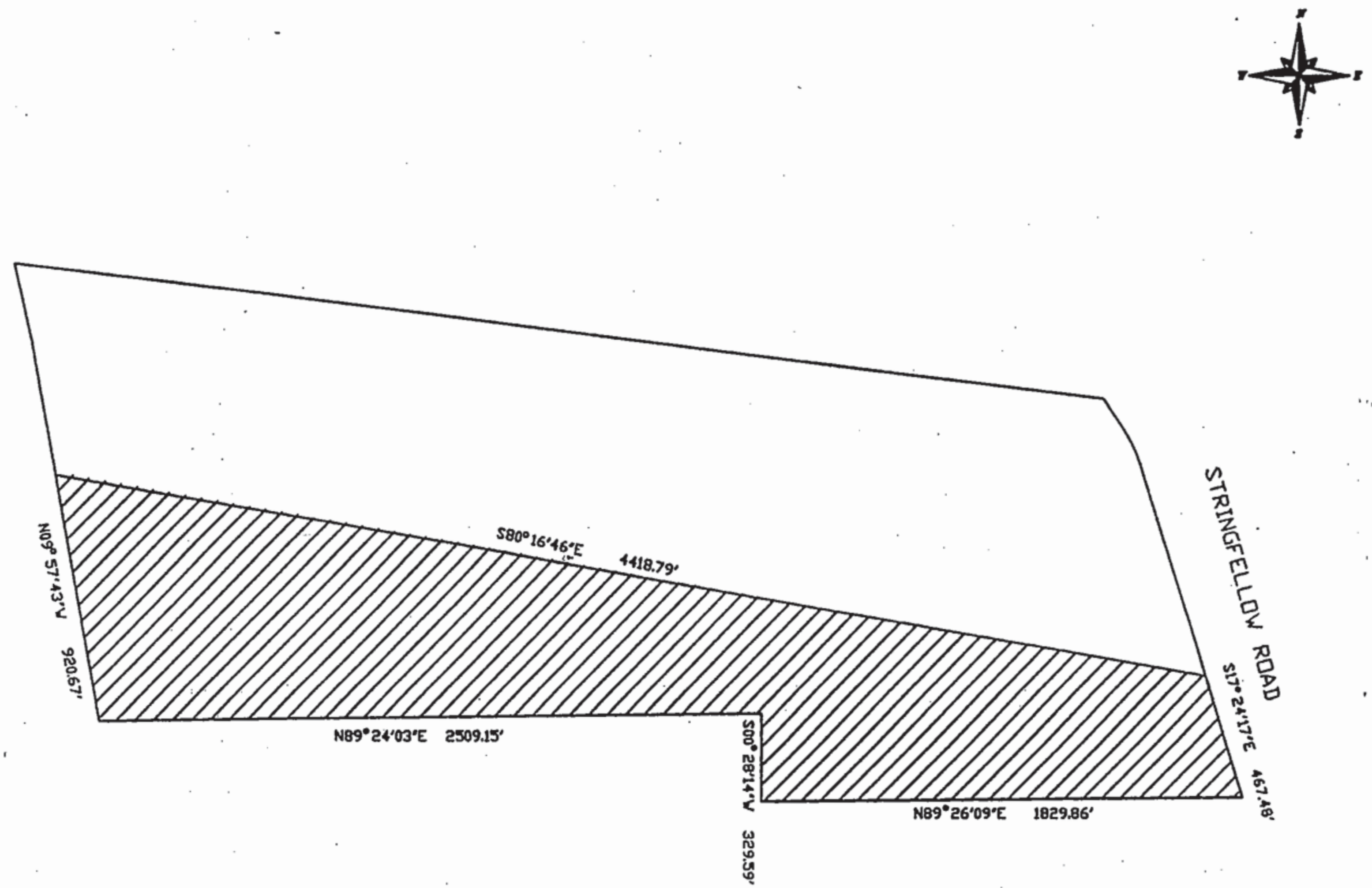


EXHIBIT "A"
FIGURE A-2
SECTION-15, TOWNSHIP-45, RANGE-22

ENVIRONMENTAL SERVICES
DIVISION: UTILITIES

LEE COUNTY
SOUTHWEST FLORIDA

FILE: | DATE | REMARKS | DRAWN
SCALE:
DATE:
DRAWN:
DESIGN:
CHECK:
APPROVED:

MEMORANDUM OF AGREEMENT
BY AND BETWEEN
LEE COUNTY UTILITIES
AND
LEE COUNTY PARKS AND RECREATION

This Memorandum of Agreement (MOA) is entered into by and between **LEE COUNTY UTILITIES**, hereinafter referred to as "LCU", and **LEE COUNTY PARKS AND RECREATION**, hereinafter referred to as "LCPR", which are a Division and a Department, respectively, of **LEE COUNTY**, hereinafter referred to as "County", a political subdivision of the State of Florida.

WHEREAS, LCU operates a wastewater treatment facility known as the Pine Island Wastewater Treatment Plant (PIWWTP) that produces effluent water of a quality sufficient for the irrigation of grasses, woodlands, and certain crops; and

WHEREAS, as a condition to operate the Pine Island Wastewater Plant at its current permitted capacity, Florida Department of Environmental Protection (FDEP) Permit No. 176460 requires LCU to secure lands to receive reclaimed water produced at the PIWWTP; and,

WHEREAS, LCU entered into an Agreement For the Delivery Of Reclaimed Effluent Water on August 3, 1999, with the prior land owner, Village Links Land Trust, encompassing the property described in attached Exhibit A that expired in 2009; and

WHEREAS, on January 26, 2004 Village Links Land Trust sold the property described in attached Exhibit A, also known as the Pine Island Flatwoods Preserve Nomination 184, to Lee County through the Conservation 2020 Lands Program (Pine Island Flatwoods Preserve); and,

WHEREAS, the Board of County Commissioner approved the Pine Island Flatwoods Preserve Land Stewardship Plan on June 20, 2006, identifying the stewardship goals and uses of the preserve; and,

WHEREAS, the purpose of this agreement is to restore the Pine Island Flatwoods Preserve to a natural system and provide LCU sufficient time to locate an alternate spray field; and,

WHEREAS, LCU and LCPR now desire to enter into a MOA establishing terms and conditions whereby LCU will continue to deliver and LCPR agrees to accept reclaimed water to Pine Island Flatwoods;

WHEREAS, the Board of County Commissioner affirmed the terms and conditions of this Agreement at its 1/4/2011 Board meeting as agenda item Bluesheet # 20101227 ; and

C9b
1-4-11

NOW, THEREFORE, LCU and the LCPR mutually agree as follows:

1. The above recitals are true and correct and incorporated herein as though fully set forth below.

2. LCU will take full responsibility for the care and maintenance of its reclaimed water lines, spray heads and monitoring wells existing on the Pine Island Flatwoods Preserve parcel as of the date this MOA was executed. LCU will not install additional effluent water lines or spray heads. LCPR agrees to allow LCU, at its expense, to install necessary fencing and posts to protect spray heads and monitoring wells from damage caused by cattle grazing operations. If LCU deems they are necessary, LCU will coordinate and work with LCPR to design cattle exclusion fences around each of the spray heads and monitoring wells. The costs of these improvements will be borne by LCU.

3. Reclaimed effluent water delivered under this Agreement must be treated by LCU to levels that meet all federal and state requirements for irrigation on lands with public access. Reclaimed effluent water must be quality tested by LCU at its source (the Pine Island Wastewater Treatment Plant) every month, and the results made available to Conservation 2020 staff. In the event such testing reveals that the reclaimed effluent water does not meet minimum local, state, or federal regulations, then the delivery of reclaimed effluent water will cease until the standards are met and certified to Conservation 2020 staff.

4. Subject and consistent with the protocol established pursuant to paragraph 6, LCU may deliver reclaimed effluent water, and LCPR will accept a volume of gallons of reclaimed water per day, not to exceed an application rate of 1.5 inches per week, and in any event, not to exceed 350,000 gallons per day, as requested and notified by LCU. LCU will install appropriate meters at the Point(s) of Delivery so that the volume of reclaimed effluent water delivered will be monitored. LCU must maintain the reclaimed effluent water distribution system at the Pine Island Flatwoods Preserve in a manner that provides at minimum monitoring of flows and percolation rates so as to avoid ponding or odor.

5. LCU agrees LCPR will not be held financially responsible for repairs to LCU facilities required as a result of the cattle grazing operations.

6. Within 30 days of execution of this agreement, LCU will provide a formal protocol for the delivery of reclaimed water produced at the PIWWTP to the various site options available acceptable to LCPR. Notwithstanding other provisions set forth in this Agreement, the protocol will reflect that Pine Island Flatwoods will be utilized for disposal of reclaimed water only after all other options are exhausted.

7. LCU current plant capacity is 0.5 MGD. LCU will diligently pursue the right to use alternative disposal sites, including Lee County park facilities, in close proximity to the existing reclaimed water transmission main capable of accepting at least the amount of reclaimed water currently permitted (0.154 MGD) to be applied at the Pine Island Flatwoods Preserve site.

8. When LCU secures alternative site or sites with a disposal capacity of 0.154 MGD or more, LCU will modify the existing FDEP operating Permit No. 176460 for the PIWWTP to remove and replace the Pine Island Flatwoods Preserve site as a reclaimed water application site.

9. Once the FDEP permit is modified to reflect use of the alternative site for reclaimed water disposal, LCU will cease use of the Pine Island Flatwoods Preserve site and remove all above ground appurtenances related to the spray irrigation system within six months of the FDEP permit issuance unless otherwise agreed to by LCPR. Below ground appurtenances related to the spray irrigation system may remain in place unless or until the appurtenances are deemed to be the cause of or related to a problem preventing the property management of the Pine Island Flatwoods Preserve in accord with the established stewardship management plan for Conservation 2020 purposes. If removal of the appurtenances becomes necessary, LCU agrees to coordinate with LCPR in the removal, including providing financial assistance as agreed between the parties, and with formal Board approval, at the time the removal is deemed necessary by LCPR.

10. LCU may continue to use the existing groundwater monitoring wells on the Pine Island Flatwoods Preserve site provided the monitoring is specifically required as a condition of LCU's regulatory permit approval or as otherwise agreed by Conservation 2020.

11. LCU will provide semi-annual water quality monitoring reports to Conservation 2020 staff. If LCU and LCPR mutually determine that effluent water is causing negative impacts to the Pine Island Flatwoods Preserve site, LCU will cease use of the spray fields until the problem causing the negative impact is identified and corrected.

12. For as long as this agreement is effective, LCU agrees to annually treat all category 1 and 2 invasive plants as identified by the most current Exotic Pest Plant Council's list of Invasive Species on the southern part of Pine Island Flatwoods Preserve nomination 184 as described in Exhibit A. LCU agrees to pay for the expense of this treatment as approved by Conservation 2020 staff.

13. Once LCU has secured an alternative disposal site, modified the FDEP permit, removed LCU facilities as required, and ceases to deliver reclaimed

water to the Pine Island Flatwoods Preserve site, the LCU land management assistance mentioned above will also cease.

14. LCU agrees to adhere to Bald Eagle nest restrictions as required by the U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission and Lee County Eagle Technical Advisory Committee.

15. This agreement will be effective for a period of ten years, unless LCU obtains an alternative disposal site prior to the end of the period and no longer needs the Pine Island Flatwoods Preserve to comply with FDEP Permit No. 176460.

    In the event LCU does not successfully secure an alternative reclaimed water disposal site within ten years of the execution of this agreement, LCU may, with the Board's affirmative approval, extend this agreement for an additional period upon formal approval by the Lee County Board of County Commissioners.

16. LCU agrees to perform a Phase I Environmental Audit at the time LCU ceases to use the property for disposal of reuse water to determine whether any negative effects were precipitated by the spray field use. If a problem is highlighted by the Phase I Audit, LCU will take all appropriate remedial action to correct the problem.

IN AGREEMENT WHEREOF, each party to this Memorandum of Agreement has caused it to be executed on the date indicated below. This agreement becomes effective on the date it is affirmed by the Board of County Commissioners.

LEE COUNTY UTILITIES

BY: _____

Doug Meurer, Assistant County Manager, Public Works

1-11-2011

Date

LEE COUNTY DEPARTMENT OF PARKS AND RECREATION

BY: _____

Barbara Manzo, Director

1-7-11

Date

APPROVED AS TO FORM:

BY: _____

Office of the County Attorney

COMPOSITE EXHIBIT "A"

Description of a Parcel of Land
Lying in
Section 15, T-45-S, R-22-E
Pine Island, Lee County, Florida
(Michael Parcel)
(North Remainder Parcel)

A parcel of land situated in the State of Florida, County of Lee, lying in Section 15, Township 45 South, Range 22 East, and further bounded and described as follows:

Starting at the northwest corner of said Section 15; thence S12° 40' 58" E for 1241.75 feet; thence 59° 57' 43" E for S10.28 feet to the northwest corner of a parcel recorded in Official Records Book 1288 at Page 2322 and the Point of Beginning; thence S80° 16' 46" E along the north line of said parcel for 4418.79 feet to the southwesterly right-of-way line of Pine Island Boulevard (S.R. 767 - 100 feet wide); thence S17° 24' 17" E along said right-of-way line for 467.48 feet; thence S89° 26' W for 1829.86 feet to a concrete post marking the east line of the southwest one quarter (SW 1/4) of said Section 15; thence N00° 28' 31" E along said east line for 329.59 feet to a concrete post marking the northeast corner of said fraction; thence S89° 23' 55" W along the south line of the northwest one quarter (NW 1/4) of said section for 2509.02 feet to a concrete monument marking the southwest corner of said parcel recorded in Official Records Book 1288 at Page 2322; thence N09° 57' 43" W along the westerly line of said parcel for 920.67 feet to the Point of Beginning.

Bearings are based on the east line of the southwest one quarter (SW 1/4) of said Section 15 as bearing N00° 28' 31" E.

Sketch of Legal Description.

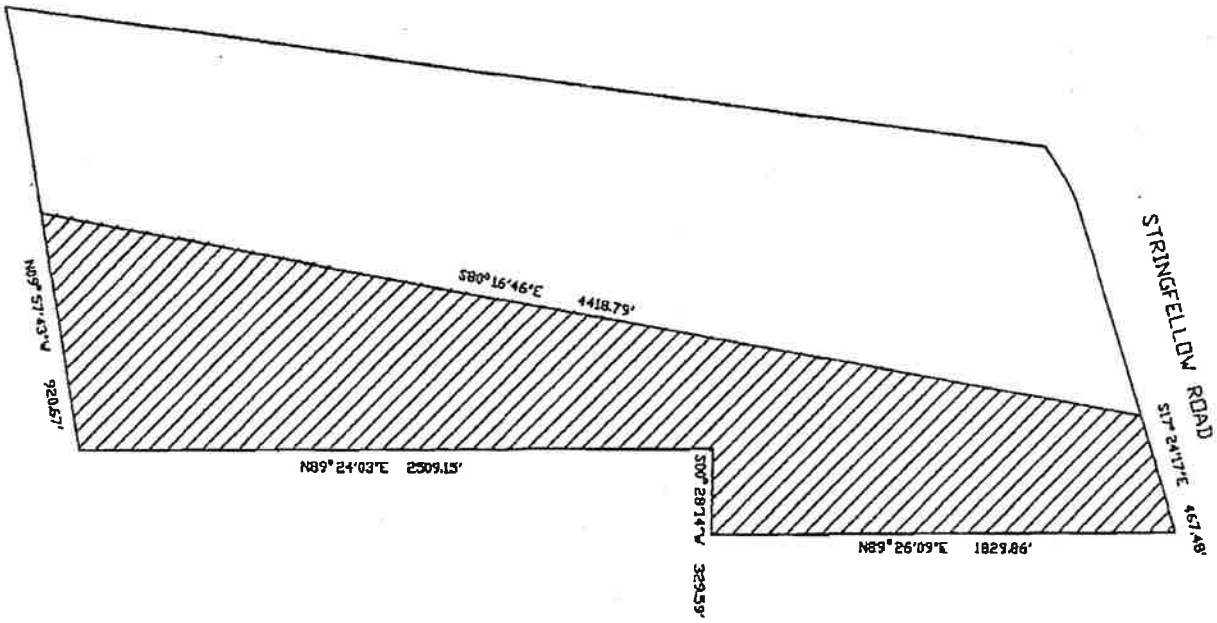


EXHIBIT "A"
FIGURE A-2
SECTION-15, TOWNSHIP-45, RANGE-22

ENVIRONMENTAL SERVICES
DIVISION: UTILITIES

LEE COUNTY
SOUTHWEST FLORIDA

Appendix F: Legal Description

Site-389

389

DESCRIPTION:

A PARCEL OF LAND IN SECTIONS 10 AND 11, TOWNSHIP 45 SOUTH, RANGE 22 EAST, PINE ISLAND, LEE COUNTY, FLORIDA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT THE SOUTHEAST CORNER OF SAID SECTION 10; THENCE S.88°40'39"W. ALONG THE SOUTH LINE OF SAID SECTION 10, A DISTANCE OF 31.76 FEET ; THENCE N.60°01'32"W. ALONG THE NORTHEASTERLY BOUNDARY LINES OF THOSE CERTAIN PARCELS OF LAND AS DESCRIBED IN OFFICIAL RECORDS BOOK 189, PAGE 489, OFFICIAL RECORDS BOOK 2892, PAGE 3473, OFFICIAL RECORDS BOOK 1151, PAGE 783 AND OFFICIAL RECORDS BOOK 2210, PAGE 2932, ALL OF THE PUBLIC RECORDS OF LEE COUNTY, FLORIDA, A DISTANCE OF 3726.97 FEET TO AN INTERSECTION WITH THE NORTHEASTERLY RIGHT-OF-WAY LINE OF STRINGFELLOW ROAD, ALSO KNOWN AS COUNTY ROAD NO. 767 (RIGHT-OF-WAY WIDTH VARIES); THENCE N.25°12'31"W. ALONG SAID NORTHEASTERLY RIGHT-OF-WAY LINE, A DISTANCE OF 652.10 FEET; THENCE N.64°47'29"E. A DISTANCE OF 171.11 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT; THENCE NORTHEASTERLY ALONG AN ARC OF SAID CURVE, HAVING A RADIUS OF 1500.00 FEET, A CENTRAL ANGLE OF 05°06'38" AND WHOSE CHORD BEARS N.67°20'48"E. A DISTANCE OF 133.75 FEET, HAVING AN ARC LENGTH OF 133.79 FEET; THENCE N.69°54'07"E. ALONG A TANGENT LINE, A DISTANCE OF 232.25 FEET; THENCE N.64°47'29"E. A DISTANCE OF 128.58 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT; THENCE EASTERLY, ALONG AN ARC OF SAID CURVE, HAVING A RADIUS OF 1530.00 FEET, A CENTRAL ANGLE OF 43°49'49" AND WHOSE CHORD BEARS N.86°42'24"E. FOR A DISTANCE OF 1142.09 FEET, HAVING AN ARC LENGTH OF 1170.42 FEET; THENCE N.18°37'18"E. ALONG A RADIAL LINE, A DISTANCE OF 260.00 FEET; THENCE N.62°16'54"E. A DISTANCE OF 661.03 FEET; THENCE N.19°16'18"E. A DISTANCE OF 288.70 FEET TO A NON-RADIAL INTERSECTION WITH A CURVE BEING CONCAVE IN THE NORTHEASTERLY SIDE WHOSE RADIUS POINT BEARS N.59°36'42"E. FROM SAID INTERSECTION; THENCE NORTHWESTERLY ALONG AN ARC OF SAID CURVE, HAVING A RADIUS OF 1530.00 FEET, A CENTRAL ANGLE OF 04°06'41" AND WHOSE CHORD BEARS N.28°19'57"W. FOR A DISTANCE OF 109.77 FEET, HAVING AN ARC LENGTH OF 109.79 FEET; THENCE N.63°42'37"E. ALONG A NON-RADIAL, NON-TANGENT LINE, A DISTANCE OF 496.44 FEET; THENCE N.48°23'55"E. A DISTANCE OF 762.01 FEET; THENCE N.88°44'20"E. A DISTANCE OF 970.00 FEET, MORE OR LESS, TO AN INTERSECTION WITH THE MEAN HIGH WATER LINE OF MATLACHA PASS; THENCE SOUTHEASTERLY ALONG SAID MEAN HIGH WATER LINE TO AN INTERSECTION WITH THE SOUTH LINE OF THE NORTH-HALF OF GOVERNMENT LOT 2 OF SAID SECTION 11, SAID MEAN HIGH WATER LINE HAVING A WITNESS LINE THAT BEARS S.51°45'13"E. A DISTANCE OF 710.49 FEET FROM THE FIRST AFOREMENTIONED INTERSECTION WITH THE MEAN HIGH WATER LINE TO THE SAID INTERSECTION WITH THE SOUTH LINE OF THE NORTH-HALF OF GOVERNMENT LOT 2 OF SECTION 11; THENCE S.88°44'20"W. ALONG THE SAID SOUTH LINE OF THE NORTH-HALF OF GOVERNMENT LOT 2, A DISTANCE OF 1517.02 FEET TO AN INTERSECTION WITH THE WEST LINE OF SAID SECTION 11, BEING ALSO THE EAST LINE OF SAID SECTION 10; THENCE S.00°50'45"E. ALONG THE SAID EAST LINE OF SECTION 10, A DISTANCE OF 1326.77 FEET TO THE EAST QUARTER CORNER OF SAID SECTION 10; THENCE S.00°36'30"E. ALONG SAID EASTERLY SECTION LINE, A DISTANCE OF 2646.34 FEET TO THE SAID POINT-OF-BEGINNING OF THIS DESCRIPTION.

ORIENTATION BASED ON EASTERLY RIGHT OF WAY OF STRINGFELLOW ROAD AS BEARING N25°12'31"W.

CONTAINING 189.82 ACRES, MORE OR LESS.

LEE COUNTY, FLORIDA

Site - 147

LEGAL DESCRIPTION

A PARCEL OF LAND SITUATED IN THE STATE OF FLORIDA, COUNTY OF LEE, LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22 EAST, AND FURTHER BOUNDED AND DESCRIBED AS FOLLOWS:

STARTING AT THE NORTHWEST CORNER OF SAID SECTION 15; THENCE S12°40'58"EFOR 1241.75 FEET; THENCE S9°57'43"E FOR 510.28 FEET TO THE NORTHWEST CORNER OF A PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 1288, PAGE 2322; THENCE S80°16'46"E ALONG THE NORTH LINE OF SAID PARCEL FOR 4418.79 FEET TO THE SOUTHWESTERLY RIGHT-OF-WAY LINE OF PINE ISLAND BOULEVARD (S.R. 767 - 100 FEET WIDE); THENCE S17°24'17"E ALONG SAID RIGHT-OF-WAY LINE FOR 1737.41 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE S17°24'17"E ALONG SAID RIGHT-OF-WAY LINE FOR 1095.57 FEET TO AN INTERSECTION WITH A CURVE CONCAVE TO THE WEST HAVING A RADIUS OF 904.89 FEET; THENCE CONTINUE ALONG SAID CURVE AND SAID RIGHT-OF-WAY LINE THROUGH A CENTRAL ANGLE OF 2°48'36" FOR 44.38 FEET TO THE SOUTH LINE OF SAID SECTION 15; THENCE S89°26'26"W, NON-TANGENTIALLY, ALONG SAID SOUTH LINE FOR 2568.82 FEET TO A CONCRETE MONUMENT MARKING THE SOUTHEAST CORNER OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE N0°28'31"E ALONG THE EAST LINE OF SAID SOUTHWEST ONE QUARTER (SW 1/4) FOR 1091.51 FEET; THENCE N89°26'26"E N89°26'26"E FOR 2219.81 FEET TO THE POINT OF BEGINNING.

CONTAINING 60.00 ACRES, MORE OR LESS.

BEARINGS BASED ON THE NORTH-SOUTH 1/4 SECTION LINE AS BEARING N00°28'31"E.

PARCEL SUBJECT TO EASEMENTS, RESTRICTIONS, RESERVATIONS AND RIGHTS-OF-WAY (RECORDED AND UNRECORDED, WRITTEN AND UNWRITTEN).

Site - 92

DESCRIPTION: TRACT "A"

A PARCEL OF LAND SITUATED IN THE STATE OF FLORIDA, COUNTY OF LEE, LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22 EAST, AND FURTHER BOUNDED AND DESCRIBED AS FOLLOWS:

STARTING AT THE NORTHWEST CORNER OF SAID SECTION 15; THENCE S 12°40'58"E FOR 1241.75 FEET; THENCE S 09°57'43"E FOR 510.28 FEET TO THE NORTHWEST CORNER OF A PARCEL RECORDED IN O.R. BOOK 1288 AT PAGE 2322; THENCE S 80°16'46"E ALONG THE NORTH LINE OF SAID PARCEL FOR 4418.79 FEET TO THE SOUTHWESTERLY RIGHT OF WAY LINE OF PINE ISLAND BOULEVARD (SR 767-100 FEET WIDE); THENCE S 17°24'17"E ALONG SAID RIGHT OF WAY LINE FOR 467.48 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE S 17°24'17"E ALONG SAID RIGHT OF WAY LINE FOR 570.69 FEET; THENCE S 89°26'26"W PARALLEL WITH THE SOUTH LINE OF THE SOUTHEAST ONE QUARTER (SE 1/4) OF SAID SECTION FOR 2005.10 FEET TO THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE N 00°28'31"E ALONG SAID EAST LINE FOR 216.70 FEET TO A CONCRETE MONUMENT MARKING THE SOUTHEAST CORNER OF THE SOUTH HALF (S 1/2) OF THE NORTHEAST ONE QUARTER (NE 1/4) OF THE NORTHEAST ONE QUARTER (NE 1/4) OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE S 89°27'01"W ALONG THE SOUTH LINE OF SAID FRACTION FOR 698.56 FEET TO A CONCRETE MONUMENT MARKING THE SOUTHWEST CORNER OF SAID FRACTION; THENCE N 00°38'30"W ALONG THE WEST LINE OF SAID FRACTION FOR 329.21 FEET TO A CONCRETE MONUMENT MARKING THE NORTHWEST CORNER OF SAID FRACTION; THENCE N 89°25'27"E ALONG THE NORTH LINE OF SAID FRACTION FOR 704.98 FEET TO A CONCRETE MONUMENT MARKING THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE N 89°26'26"E PARALLEL WITH THE SOUTH LINE OF SAID SOUTHEAST ONE QUARTER (SE 1/4) FOR 1829.86 TO THE POINT OF BEGINNING.

AND (TRACT B)

A TRACT OF LAND SITUATED IN THE STATE OF FLORIDA, COUNTY OF LEE, LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22 EAST, AND FURTHER BOUND AND DESCRIBED AS FOLLOWS

COMMENCING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER (NE1/4) OF THE AFORESAID SECTION 15; THENCE RUN S.00°28'31"W. FOR 2964.97 FEET TO A 3" X 3" CONCRETE MONUMENT; THENCE CONTINUE S.00°28'31"W. ALONG THE EAST LINE OF THE SOUTHWEST QUARTER (SW1/4) OF THE AFORESAID SECTION 15 FOR 329.59 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE S.00°28'31"W. ALONG SAID EAST LINE FOR 319.59 FEET; THENCE RUN S.89°28'39"W. FOR 692.33 FEET; THENCE RUN N.00°38'30"W FOR 319.21 FEET; THENCE RUN N.89°27'01"W. FOR 698.56 FEET TO THE POINT OF BEGINNING.

BEARINGS ARE BASED ON THE EAST LINE OF THE SOUTHWEST QUARTER (SW1/4) OF SECTION 15 AS BEING S.00°28'31"W.

CONTAINING 34.448 ACRES, MORE OR LESS.

Site 346

DESCRIPTION: TRACT "A"

A PARCEL OF LAND SITUATED IN THE STATE OF FLORIDA, COUNTY OF LEE, LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22 EAST, AND FURTHER BOUNDED AND DESCRIBED AS FOLLOWS:

STARTING AT THE NORTHWEST CORNER OF SAID SECTION 15; THENCE S 12°40'58"E FOR 1241.75 FEET; THENCE S 09°57'43"E FOR 510.28 FEET TO THE NORTHWEST CORNER OF A PARCEL RECORDED IN O.R. BOOK 1288 AT PAGE 2322; THENCE S 80°16'46"E ALONG THE NORTH LINE OF SAID PARCEL FOR 4418.79 FEET TO THE SOUTHWESTERLY RIGHT OF WAY LINE OF PINE ISLAND BOULEVARD (SR 767-100 FEET WIDE); THENCE S 17°24'17"E ALONG SAID RIGHT OF WAY LINE FOR 467.48 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE S 17°24'17"E ALONG SAID RIGHT OF WAY LINE FOR 570.69 FEET; THENCE S 89°26'26"W PARALLEL WITH THE SOUTH LINE OF THE SOUTHEAST ONE QUARTER (SE 1/4) OF SAID SECTION FOR 2005.10 FEET TO THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE N 00°28'31"E ALONG SAID EAST LINE FOR 216.70 FEET TO A CONCRETE MONUMENT MARKING THE SOUTHEAST CORNER OF THE SOUTH HALF (S 1/2) OF THE NORTHEAST ONE QUARTER (NE 1/4) OF THE NORTHEAST ONE QUARTER (NE 1/4) OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE S 89°27'01"W ALONG THE SOUTH LINE OF SAID FRACTION FOR 698.56 FEET TO A CONCRETE MONUMENT MARKING THE SOUTHWEST CORNER OF SAID FRACTION; THENCE N 00°38'30"W ALONG THE WEST LINE OF SAID FRACTION FOR 329.21 FEET TO A CONCRETE MONUMENT MARKING THE NORTHWEST CORNER OF SAID FRACTION; THENCE N 89°25'27"E ALONG THE NORTH LINE OF SAID FRACTION FOR 704.98 FEET TO A CONCRETE MONUMENT MARKING THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE N 89°26'26"E PARALLEL WITH THE SOUTH LINE OF SAID SOUTHEAST ONE QUARTER (SE 1/4) FOR 1829.86 TO THE POINT OF BEGINNING.

AND (TRACT B)

A TRACT OF LAND SITUATED IN THE STATE OF FLORIDA, COUNTY OF LEE, LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22 EAST, AND FURTHER BOUND AND DESCRIBED AS FOLLOWS

COMMENCING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER (NE1/4) OF THE AFORESAID SECTION 15; THENCE RUN S.00°28'31"W. FOR 2964.97 FEET TO A 3" X 3" CONCRETE MONUMENT; THENCE CONTINUE S.00°28'31"W. ALONG THE EAST LINE OF THE SOUTHWEST QUARTER (SW1/4) OF THE AFORESAID SECTION 15 FOR 329.59 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE S.00°28'31"W. ALONG SAID EAST LINE FOR 319.59 FEET; THENCE RUN S.89°28'39"W. FOR 692.33 FEET; THENCE RUN N.00°38'30"W FOR 319.21 FEET; THENCE RUN N.89°27'01"W. FOR 698.56 FEET TO THE POINT OF BEGINNING.

BEARINGS ARE BASED ON THE EAST LINE OF THE SOUTHWEST QUARTER (SW1/4) OF SECTION 15 AS BEING S.00°28'31"W.

CONTAINING 34.448 ACRES, MORE OR LESS.

Site-121

DESCRIPTION (O.R. 2052, P. 4163)

THE NORTH HALF (N 1/2) OF SECTION 22, TOWNSHIP 45 SOUTH, RANGE 22 EAST; AND THAT PART OF THE NORTH HALF (N 1/2) OF SECTION 23, TOWNSHIP 45 SOUTH, RANGE 22 EAST, LYING WEST OF COUNTY ROAD NO. 767, IN LEE COUNTY, FLORIDA.

PINE ISLAND, LEE COUNTY, FLORIDA

site - 184

DESCRIPTION:

A PARCEL OF LAND SITUATED IN THE STATE OF FLORIDA, COUNTY OF LEE, LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22 EAST AND FURTHER BOUNDED AND DESCRIBED AS FOLLOWS:

STARTING AT THE NORTHWEST CORNER OF SAID SECTION 15; THENCE S12°40'58"E FOR 1241.75 FEET; THENCE S09°57'43"E FOR 510.28 FEET TO THE NORTHWEST CORNER OF A PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 1288, PAGE 2322; THENCE S80°16'46"E ALONG THE NORTH LINE OF SAID PARCEL FOR 4418.79 FEET TO THE SOUTHWESTERLY RIGHT-OF-WAY OF STRINGFELLOW ROAD (PINE ISLAND BOULEVARD - CR 767 - 100 FEET WIDE); THENCE S17°24'17"E ALONG SAID RIGHT-OF-WAY FOR 1038.18 FEET TO THE NORTHEAST CORNER OF A PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 3689 AT PAGE 4657 AND THE POINT OF BEGINNING; THENCE S89°26'26"W ALONG THE NORTH LINE OF SAID PARCEL FOR 1945.10 FEET TO AN INTERSECTION WITH A LINE LYING 60.00 FEET EAST OF AND PARALLEL WITH THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE S00°28'31"W ALONG SAID PARALLEL LINE FOR 1161.82 FEET TO AN INTERSECTION WITH THE EASTERLY EXTENSION OF A LINE LYING 60.00 FEET SOUTH OF THE NORTH LINE OF THE SOUTHEAST ONE QUARTER (SE 1/4) OF THE SOUTHEAST ONE QUARTER (SE 1/4) OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE S89°33'39"W ALONG SAID LINE LYING 60.00 FEET SOUTH OF THE NORTH LINE OF SAID FRACTION FOR 731.70 FEET TO THE WEST LINE OF SAID FRACTION; THENCE N00°38'30"W ALONG SAID FRACTIONAL LINE FOR 60.00 FEET TO THE NORTHWEST CORNER OF SAID FRACTION; THENCE N89°33'39"E ALONG THE NORTH LINE OF SAID FRACTION FOR 672.87 FEET TO THE NORTHEAST CORNER OF SAID FRACTION; THENCE N00°28'31"E ALONG THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15 FOR 1101.68 FEET TO THE NORTHWEST CORNER OF SAID PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 3689 AT PAGE 4657; THENCE CONTINUE N00°28'31"E ALONG SAID QUARTER SECTION LINE FOR 60.01 FEET; THENCE N89°26'26"E PARALLEL WITH AND 60.00 FEET NORTH OF THE NORTH LINE OF SAID PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 3689 AT PAGE 4657 FOR 1985.85 FEET TO THE SOUTHWESTERLY RIGHT-OF-WAY LINE OF SAID STRINGFELLOW ROAD; THENCE S17°24'17"E ALONG SAID RIGHT-OF-WAY LINE FOR 62.69 FEET TO THE POINT OF BEGINNING.

EASEMENT CONTAINING 5.27 ACRES, MORE OR LESS.

BEARINGS BASED ON THE NORTH-SOUTH ONE QUARTER (N-S 1/4) SECTION LINE AS BEARING N00°28'31"E.

BOUNDARY SURVEY OF
THE SOUTHEAST QUARTER (SE1/4) OF THE SOUTHEAST QUARTER (SE 1/4) SOUTHWEST QUARTER (SW 1/4) SECTION 15, TOWNSHIP 44 SOUTH, RANGE 22 EAST, LEE COUNTY, FLORIDA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGIN AT THE SOUTH QUARTER CORNER OF SECTION 15, TOWNSHIP 44 SOUTH, RANGE 22 EAST, BEING THE SOUTHEAST CORNER OF THE SOUTHEAST QUARTER SOUTHEAST QUARTER SOUTHWEST QUARTER SAID SECTION 15; THENCE RUN S 88°58'55" W ALONG THE SOUTH LINE SAID SECTION 15 FOR 660.00 FEET TO THE SOUTHWEST CORNER SAID FRACTION OF SECTION; THENCE RUN N 00°16'00" W ALONG THE WEST LINE SAID FRACTION OF SECTION FOR 658.30 FEET TO THE NORTHWEST CORNER SAID FRACTION OF SECTION; THENCE RUN N 88°54'49" E ALONG THE NORTH LINE SAID FRACTION OF SECTION FOR 672.72 FEET TO THE NORTHEAST CORNER SAID FRACTION OF SECTION; THENCE RUN S 00°09'39" E ALONG THE EAST LINE SAID FRACTION OF SECTION AND THE EAST LINE OF THE SOUTHWEST QUARTER SAID SECTION 15 FOR 659.17 FEET TO THE POINT OF BEGINNING, CONTAINING 438,924 SQUARE FEET OF LAND OR 10.07631 ACRES.
SUBJECT TO A 30 FOOT NON EXCLUSIVE EASEMENT ALONG THE NORTH LINE AND A 6 FOOT LEE COUNTY CO-OPERATIVE EASEMENT ALONG THE EAST LINE AND A PORTION OF THE SOUTH LINE.

SURVEYORS CERTIFICATE
TO LEE COUNTY, A POLITICAL SUBDIVISION OF THE STATE OF FLORIDA, STRAP NO. 15-45-22-00-00006.0000, WAGGONER & BRUEHL, P.A. AND ATTORNEYS' TITLE INSURANCE FUND, INC.
THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH "MINIMUM STANDARD DETAIL REQUIRMENTS FOR ALTA/ACSM LAND TITLE SURVEYS" JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS IN 2005 AND INCLUDES ITEMS 1, 2, 3, 4, 10, 11, 13 AND 14 OF TABLE "A" THEREOF, PURSUANT TO THE ACCURACY STANDARDS AS ADOPTED BY ALTA AND NSPS AND IN EFFECT ON THE DATE OF THIS CERTIFICATION, UNDERSIGNED FURTHER CERTIFIES THAT IN MY PROFESSIONAL OPINION, AS A LAND SURVEYER REGISTERED IN THE STATE OF FLORIDA, THE RELATIVE POSITIONAL ACCURACY OF THIS SURVEY DOES NOT EXCEED THAT WHICH IS SPECIFIED THEREIN. THIS SURVEY IS BASED ON A TITLE REPORT BY ATTORNEYS' TITLE INSURANCE FUND, INC. NUMBER OPM-2670300.

NOTE:
BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE STATE PLANE COORDINATE SYSTEM, FLORIDA WEST ZONE.
NATIONAL FLOOD INSURANCE DATA, COMMUNITY PANEL NUMBER 125124 0390 F, FEDERAL FLOOD ZONE AE, ELEVATION 7'

ALFRED J. WATSON
PROFESSIONAL SURVEYOR AND MAPPER
#2330 - STATE OF FLORIDA

FOR: LEE COUNTY, FLORIDA
JOB # 08-0195 F. B. L 111-50
STRAP # 15-45-22-00-00006.0000

DATE: NOVEMBER 20, 2008
DATE: REV 12/8/08
DATE:

THE SURVEY DEPICTED HEREON IS NOT COVERED BY PROFESSIONAL LIABILITY INSURANCE

Site - 402

site-168

DESCRIPTION:
A PARCEL OF LAND SITUATED IN THE STATE OF FLORIDA, COUNTY OF LEE, LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22 EAST AND FURTHER BOUNDED AND DESCRIBED AS FOLLOWS:

STARTING AT THE NORTHWEST CORNER OF SAID SECTION 15; THENCE S12°40'58"E FOR 1241.75 FEET; THENCE S09°57'43"E FOR 510.28 FEET TO THE NORTHWEST CORNER OF A PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 1288, PAGE 2322; THENCE S80°16'46"E ALONG THE NORTH LINE OF SAID PARCEL FOR 4418.79 FEET TO THE SOUTHWESTERLY RIGHT-OF-WAY OF STRINGFELLOW ROAD (PINE ISLAND BOULEVARD - CR 767 - 100 FEET WIDE); THENCE S17°24'17"E ALONG SAID RIGHT-OF-WAY FOR 1038.18 FEET TO THE NORTHEAST CORNER OF A PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 3689 AT PAGE 4657 AND THE POINT OF BEGINNING; THENCE S89°26'26"W ALONG THE NORTH LINE OF SAID PARCEL FOR 1945.10 FEET TO AN INTERSECTION WITH A LINE LYING 60.00 FEET EAST OF AND PARALLEL WITH THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE S00°28'31"W ALONG SAID PARALLEL LINE FOR 1161.82 FEET TO AN INTERSECTION WITH THE EASTERLY EXTENSION OF A LINE LYING 60.00 FEET SOUTH OF THE NORTH LINE OF THE SOUTHEAST ONE QUARTER (SE 1/4) OF THE SOUTHEAST ONE QUARTER (SE 1/4) OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15; THENCE S89°33'39"W ALONG SAID LINE LYING 60.00 FEET SOUTH OF THE NORTH LINE OF SAID FRACTION FOR 731.70 FEET TO THE WEST LINE OF SAID FRACTION; THENCE N00°38'30"W ALONG SAID FRACTIONAL LINE FOR 60.00 FEET TO THE NORTHWEST CORNER OF SAID FRACTION; THENCE N89°33'39"E ALONG THE NORTH LINE OF SAID FRACTION FOR 672.87 FEET TO THE NORTHEAST CORNER OF SAID FRACTION; THENCE N00°28'31"E ALONG THE EAST LINE OF THE SOUTHWEST ONE QUARTER (SW 1/4) OF SAID SECTION 15 FOR 1101.68 FEET TO THE NORTHWEST CORNER OF SAID PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 3689 AT PAGE 4657; THENCE CONTINUE N00°28'31"E ALONG SAID QUARTER SECTION LINE FOR 60.01 FEET; THENCE N89°26'26"E PARALLEL WITH AND 60.00 FEET NORTH OF THE NORTH LINE OF SAID PARCEL DESCRIBED IN OFFICIAL RECORD BOOK 3689 AT PAGE 4657 FOR 1985.85 FEET TO THE SOUTHWESTERLY RIGHT-OF-WAY LINE OF SAID STRINGFELLOW ROAD; THENCE S17°24'17"E ALONG SAID RIGHT-OF-WAY LINE FOR 62.69 FEET TO THE POINT OF BEGINNING.

EASEMENT CONTAINING 5.27 ACRES, MORE OR LESS.

BEARINGS BASED ON THE NORTH-SOUTH ONE QUARTER (N-S 1/4) SECTION LINE AS BEARING N00°28'31"E.

Appendix G: Cattle Lease

LICENSE AGREEMENT FOR CATTLE GRAZING

This AGREEMENT made this 30 day of Sept., 2015, by and between LEE COUNTY, a political subdivision and charter county of the State of Florida, whose address is P.O. Box 398, Fort Myers, Florida 33902-0398, (Licensor); and James Newland , an individual, whose address is 4444 Berkshire Rd., St. James City, FL 33956, (Licensee).

WHEREAS, Licensor is the owner of property situated in Lee County and depicted and described in attached Exhibit A; and

WHEREAS, Licensor, in consideration of the fees paid and the covenants and agreements set forth herein to be kept and performed by the Licensee, does hereby grant to the Licensee a license solely for the grazing of cattle on Licensors lands as depicted/described in attached Exhibit B (Licensed Property).

NOW, THEREFORE, in consideration of the covenants and conditions set forth below, the parties agree as follows:

1. Recitals. The above recitals are true and correct and incorporated herein as though fully set forth below.

2. License. Licensor hereby grants to Licensee a revocable, non-exclusive License to graze cattle on the property described in attached Exhibit B.

3. License Fee. Licensee agrees to pay Lee County $129.50 per year for each license term or portion thereof is due in advance or before September 15th of each year. Payment may be provided to the Conservation 20/20 Supervisor for appropriate processing.

4. Term. This License begins on the date it is fully executed and ends September 30. The term of this license may be extended for one additional year, beginning October 1 and ending September 30upon mutual agreement of the parties. Licensee must request the extension by August 31st.

5. Revocation, Expiration, Termination or Cancellation. Licensor may revoke the License at any time with 30 days written notice to Licensee. Upon termination of the License, Licensee must remove all cattle and return the property to Licensor in as good or better condition that when it was first licensed.

The parties understand and agree that this License Agreement may be canceled upon 48 hours written notice to the Licensee, if any of the Licensees cattle are not kept within the confines of the Licensed Property as described on Exhibit B. Cattle may be transferred between adjacent or adjoining property, provided the properties are both the

7. Fencing.

a. During the term of this License, Licensee must maintain all perimeter and interior fencing necessary to keep livestock within the licensed area as follows:

1. Along all road frontage the fencing must be, at minimum, a 5 strand barbed wire fence.

2. Along non-road frontage license boundaries the fencing must be, at minimum, a 4 strand barbed wire fence.

3. The fencing must be maintained in good repair and must effectively prevent cattle from roaming beyond the boundaries of the Licensed Property at all times during the term of this license.

b. At the end of the license period stated in this Agreement, Licensee must turn over the Licensed Property with the fencing in good repair. In the event the fencing is not in good repair, Lee County may take one or more of the following actions: repair the fencing and send an invoice for the repair costs to Licensee; refuse to License County property to Licensee (including any entity involving the Licensee) in the future; or, take any other action the County deems appropriate.

8. Survey monuments. All section corners, quarter corners, and other survey monuments lying in the premises will be properly flagged by the Licensor. Licensee agrees to bear any survey costs for resetting these monuments in the event they are disturbed by the Licensee in any way.

9. Indemnification. Licensee hereby indemnifies and releases the Licensor from any and all claims for damages to both persons and property as the result of the cattle grazing; and, holds Licensor harmless from all damages during the term of this Agreement to include all reasonable fees, costs and expenses incurred for litigation in any forum resulting from damage claimed by third parties as a result of the Licensee's use of the property described in Exhibit "B".

10. Insurance. Licensee must maintain Premises Liability Insurance coverage through the license term and provide proof of insurance to Lee County Parks and Recreation for the duration of the license. The policy must provide minimum limits of $1,000,0000 (combined Single Limit of Bodily Injury and Property Damage). Lee County must be named as a Certificate Holder and Additional Insured on the insurance policy. (A copy of the insurance certificate is attached as Exhibit C.)

11. Personal property taxes. Licensee covenants and agrees to file an annual personal property tax return with the County of Lee, State of Florida, as required by law.

Licensee: James Newland

Witness: _____

Print Name: _____

By: _____

Printed name: _____

Witness: _____

Print Name: _____

Witness: _____

Print Name: _____

Witness: _____

Print Name: _____

Lee County Parks and Recreation

By: _____

__ Dana Kasler, Director

X Alise Flanjack, Deputy Director

Approved as to form for the
Reliance of Lee County only:

By: _____

Lee County Attorney's Office

[The Board of County Commissioners delegated authority to the Director of Parks and Recreation to enter short term leases/licenses for cattle grazing on Conservation 2020 lands and other lands managed by Lee County pursuant to Bluesheet #19990807 adopted on August 17, 1999.]

EXHIBIT A Site #184 Pine Island Flatwoods Pres.

BOUNDARY AND LOCATION SURVEY OF THE FOLLOWI

DESCRIPTION OF TRACT "A"

A TRACT OR PARCEL OF LAND LYING IN THE NORTH 1/2 OF SECTION 1[illegible] TOWNSHIP 45 SOUTH, RANGE 22 EAST, PINE ISLAND, LEE COUNTY, FLORI WHICH TRACT OR PARCEL IS DESCRIBED AS FOLLOWS:

FROM THE INTERSECTION OF THE NORTH LINE OF SAID SECTION WITH T SOUTHWESTERLY LINE 50' FROM THE CENTERLINE OF PINE ISLAND ROAI STATE ROAD S-767 RUN S 33°44'00" E ALONG SAID SOUTHWESTERLY LI FOR 1773.35' TO A CONCRETE POST AND THE POINT OF BEGINNING OF T HEREIN DESCRIBED PARCEL, FROM SAID POINT OF BEGINNING, RUN N 89°04'36" W FOR 4153.04' TO A CONCRETE POST; THENCE RUN S 12°40'58" E FOR 287.98' TO A POINT; THENCE RUN S 09°57'43" E FOR 510.37' TO A POINT; THENCE RUN S 80°16'46" E FOR 4418.35' TO AN INTERSECTION WITH SAID SOUTHWESTERLY LINE OF PINE ISLANI ROAD; THENCE RUN N 17°23'51" W ALONG SAID SOUTHWESTERLY LINE FOR 822.23' TO A POINT OF CURVATURE; THENCE RUN NORTHWESTERLY ALONG SAID SOUTHWESTERLY LINE AND ALONG THE ARC OF A CURVE T THE LEFT OF RADIUS 522.52' FOR 148.98' TO A POINT OF TANGECNCY; THENCE RUN N 33°44'00" W ALONG SAID SOUTHWESTERLY LINE FOR 132.82' TO THE POINT OF BEGINNING; CONTAINING 84.88' ACRES, MORE OR LESS.

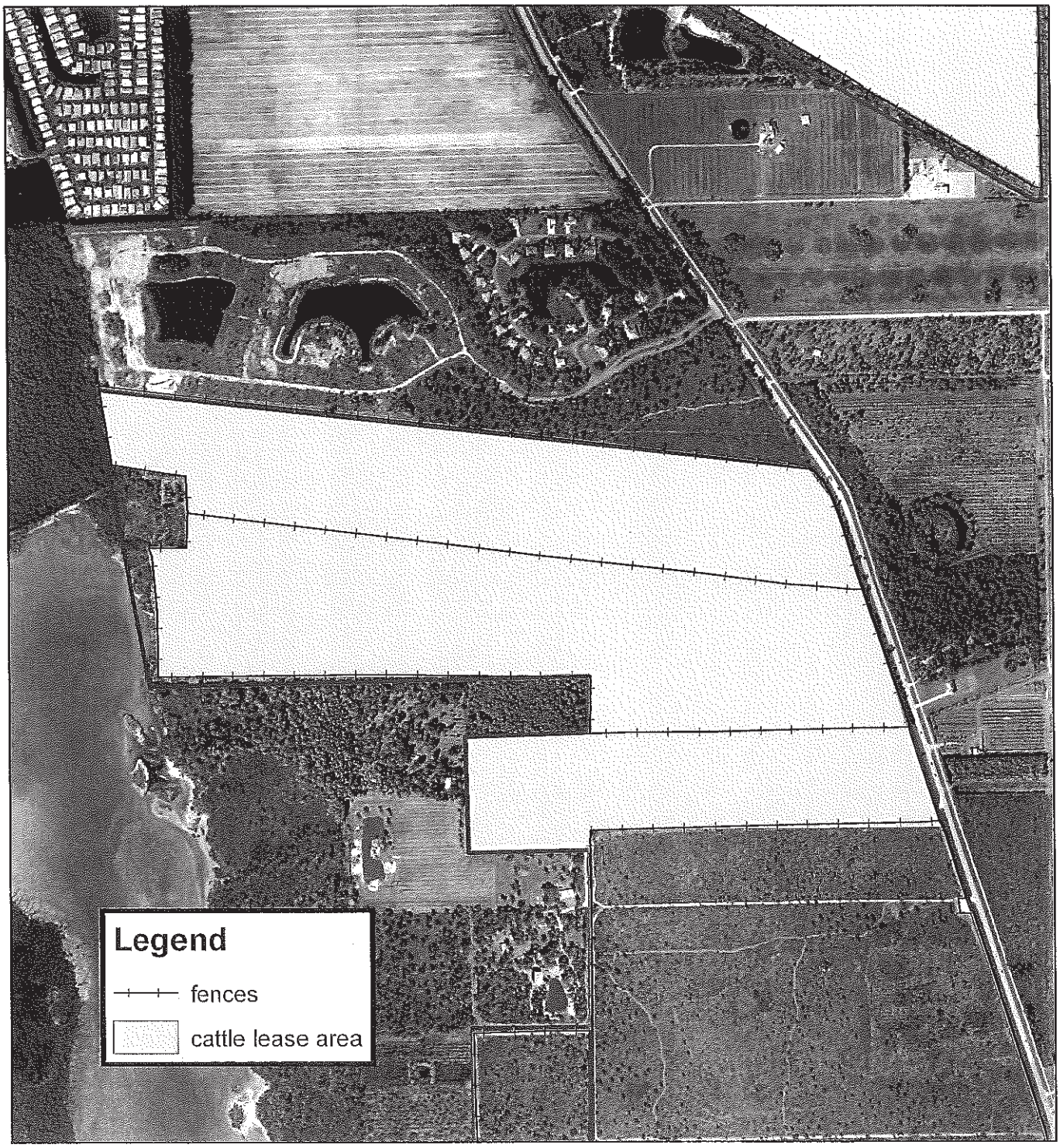
ABOVE MENTIONED BEARINGS ARE FROM ASSUMING THE SOUTHWESTERLY LINE OF SAID STATE ROAD S-767 TO BEAR N 33°44'00" W, AS RECORDED IN O.R. BOOK 1288, PAGE 2322.

DESCRIPTION OF TRACT "B"

A TRACT OR PARCEL OF LAND LYING IN SECTION 15, TOWNSHIP 45 SOU RANGE 22, EAST, PINE ISLAND, LEE COUNTY, FLORIDA WHICH TRACT OR PARCEL IS DESCRIBED AS FOLLOWS:

FROM THE CONCRETE POST MARKING THE NORTHWEST CORNER OF SAID SECTION 15, RUN S 12°40'58" E ALONG THE EASTERLY EDGE OF THE WETLANDS ADJACENT TO PINE ISLAND SOUND FOR 1241.75' TO A STEEL PIPE; THENCE RUN S 09°57'43" E ALONG SAID EASTERLY LINE FOR 510.37' TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED PARCEL FROM SAID POINT OF BEGINNING, RUN S 80°16'46" E FOR 4418.35' TO AN INTERSECTION WITH THE SOUTHWESTERLY LINE (50' FROM THE CENTERLINE) OF PINE ISLAND BOULEVARD; THENCE RUN S 17°23'51" E ALONG SAID SOUTHWESTERLY LINE FOR 467.48' TO A POINT ON THE SOUTHERLY LINE OF THE NORTH 1/8 OF THE SOUTHEAST 1/4 OF SAID SECTION 15; THENCE S 89°26'09" W ALONG THE SAID SOUTH LINE NORTH 1/8 A DISTANCE OF 1829.86' TO A POINT ON THE WEST LINE SAID SOUTHEAST QUARTER; THENCE N 00°28'14" E ALONG SAID WEST LINE A DISTANCE OF 329.59' TO A CONCRETE MONUMENT MARKING THE CENTER OF SAID SECTION 15; THENCE RUN S 89°24'03" W. ALONG THE SOUTHERLY LINE OF THE NORTHWEST QUARTER OF SAID SECTION FOR 2508.94' TO A CONCRETE POST MARKING THE INTERSECTION WITH THE EASTERLY LINE OF SAID WETLANDS; THENCE RUN N 09°57'43" W ALONG SAID EASTERLY LINE FOR 920.67' TO THE POINT OF BEGINNING.

Pine Island Flatwood Preserve Cattle Lease Map Site 184
Exhibit B 2015



N
W E
S

0 0.1 0.2 0.4 Miles

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 1/20/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

Argenia, LLC
PO Box 17370
Little Rock, AR 72222-7370

CONTACT NAME: Argenia, LLC
PHONE (A/C, No, Ext): (501) 227-9670 FAX (A/C, No): (501) 227-8105
E-MAIL ADDRESS: info@argenia.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Nautilus Insurance Company	17370
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED

Brian James Newland
4444 Berkshire Rd
Saint James City, FL 33956

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	☐ ☐ CLAIMS-MADE ☐ OCCUR						MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	☐ POLICY ☐ PRO-JECT ☐ LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N						☐ WC STATU-TORY LIMITS ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ (Mandatory in NH)	N/A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	Farm and Ranch Comprehensive Personal Liability	X		PM000633	1/22/2015	1/22/2016	COVERAGE L - PERSONAL LIABILITY	$ 1,000,000
							COVERAGE M - MEDICAL PAYMENTS TO OTHERS	$ 1,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

Lee County Board of Commissioners
3410 Palm Beach Blvd
Ft. Myers, FL 33916

(239) 462-1687

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE Elizabeth A [illegible] #A003280

Appendix H: PIFP-Bayside Restoration Plan

Pine Island Flatwoods Preserve Bayside Restoration Plan

Prepared for Lee County Conservation 20/20

August 2016 last revised 9 September 2016

Eco Planz Inc.

Consulting Ecologist

Sustainable Choices

2069 First Street, Suite 303
Fort Myers, FL 33901

+1.239.628.5616
www.ecoplanz.com

Pine Island Flatwoods Preserve Bayside
Pasture Restoration Plan

Purpose:

This Pine Island Flatwoods Preserve Bayside (Preserve) restoration plan includes two major components: (1) restoration of the improved pasture to appropriate native plant communities; and (2) freshwater marsh enhancement.

Pasture Restoration

The Preserve contains an approximately 67 acre improved pasture (Figure 1A). The goal of the pasture restoration plan is to introduce key native species including trees, shrubs, and herbaceous plants to enhance the wildlife value and introduce seed sources to create appropriate native plant communities over an extended period of time with minimal use of herbicides.

Freshwater Marsh Enhancement

The existing ditch network (Figure 2A) will be evaluated to determine where backfilling or plugging ditches will enhance the existing freshwater marsh; if the ditch receiving storm water from Stringfellow Road can be diverted through a created marsh to enhance the native habitats through sheet flow and improve the quantity and quality of storm water discharging into the estuary.

Target Plant Communities: The target plant communities chosen are temperate hardwood (FLUCCS-625), pine flatwoods (FLUCCS-411), herbaceous freshwater marsh (FLUCCS-641), and dry prairie (FLUCCS-310)(Figure 3A). The location of each was determined through field investigations and LiDAR topography.

Dry prairie

A dry prairie (+/- 28 acres) will be restored through the enhancement of the central portion of the existing pasture. This area will be managed to encourage an herbaceous plant community dominated by grasses, sedges and rushes with broadleaf herbaceous plants. Appropriate native species include but are not limited to lopsided indiangrass (*Sorghastrum secundum*), flatsedges (*Cyperus* spp.), broomsedges (*Andropogon* spp.), rushes (*Juncus* spp.), bristly foxtail (*Setaria geniculata*), Florida sunflower (*Helianthus* spp.), tickseed (*Coreopsis floridana*), blazing star (*Liatris* spp.), thistle (*Cirsium* spp.), frogfruit (*Phyla nodiflora*), American beautyberry (*Callicarpa americana*), and shiny blueberry (*Vaccinium myrsinites*).

Dry prairie habitat is important for grassland species of birds such as the meadowlark and bluebird, reptiles such as the Eastern indigo snake, and small mammals.

Herbaceous Freshwater Marsh

An herbaceous freshwater marsh (+/- 3 acres) will be created along the south and southeast portion of the pasture. The existing ditch on the south property line that conveys storm water from Stringfellow Road directly into the estuary, will be diverted through the created marsh to provide water quality treatment, and ultimately sheet flow through existing hydric flatwoods and mangrove to the back estuary.

A detailed plan for the herbaceous freshwater marsh will be provided upon completion of the ditch evaluation and engineer modeling. This portion of the restoration plan involves restructuring of ditches including diversion and filling. Therefore, a Statewide Environmental Resource Permit (SWERP) and US Army Corps of Engineers (Corps) permit will be required prior to commencing construction. The upland restoration does not require a SWERP or Corps permit, however, portions of the upland pasture that are to receive the fill generated (Figure 4A) from the marsh creation will not be planted until the SWERP and Corps permits are obtained.

The created marsh will provide habitat for wetland dependent wildlife species including wading birds, fish, reptiles, mammals, and amphibians.

Pine Flatwoods

Two pine flatwoods restoration areas are planned. A longleaf pine dominated flatwoods (+/- 13 acres) is designated along Stringfellow Road. A mesic pine flatwoods (+/- 10 acres) dominated by south Florida slash pine is located within the northeastern portion of the existing pasture.

The longleaf pine flatwoods will have plots with trees, shrubs and herbaceous groundcover planted. Vegetation to be introduced includes, but is not limited to, longleaf pine (*Pinus palustris*), saw palmetto (*Serenoa repens*), tarflower (*Bejaria racemosa*), rusty lyonia (*Lyonia ferruginea*), gopher apple (*Licani michauxii*), wire grass (*Aristida* spp.), shiny blueberry, milk pea (*Galactia floridana*), blazing star, pawpaw (*Asimina* spp.), and partridge pea (*Chamaecrista fasciculata*). Herbaceous areas will be managed to encourage the growth of native grasses, sedges, and groundcover such as gopher apple. Both container grown plants and seeds may be used to increase diversity. This area will provide important gopher tortoise burrowing and foraging habitat for the existing gopher tortoises and sustain future hatchlings.

The south Florida slash pine flatwoods will provide a transition from the uplands to the

west into the wetlands to the east. Container grown south Florida slash pine (*Pinus elliottii densa)* and saw palmetto will be planted throughout this flatwoods area. Planting plots will be established for introduction of native shrubs and groundcover including shiny lyonia (*Lyonia lucida*), gallberry (*Ilex coriacea*), wiregrass, browneyed susan (*Rudbeckia* spp.), Florida sunflower, and tickseed. The slash pine flatwoods will provide foraging and nesting habitat for native fauna and migrating avifauna.

Temperate Hardwood

A mesic temperate hardwood community (+/- 12 acres) will be created north of the created marsh. Emphasis will be on introducing native canopy and midstory plants to provide cover and forage for wildlife. Oak and sabal palm (*Sabal palmetto*) will be the primary canopy species. Both live oak (*Quercus virginiana*) and laurel oak (*Quercus laurifolia*) will be planted and naturally recruited. There are naturally recruited trees of these species already present. Sabal palm is naturally recruiting. This plan does not include the translocation of mature sabal palms to the preserve. The midstory vegetation to be planted will consist of native shrub species such as myrsine (*Myrsine guianensis*), beauty berry, coralbean (*Erythrina herbacea*), and wild coffee (*Psychotria nervosa*).

Temperate hardwood habitat is important for sustaining migratory songbirds, and providing greater plant diversity for foraging gopher tortoises.

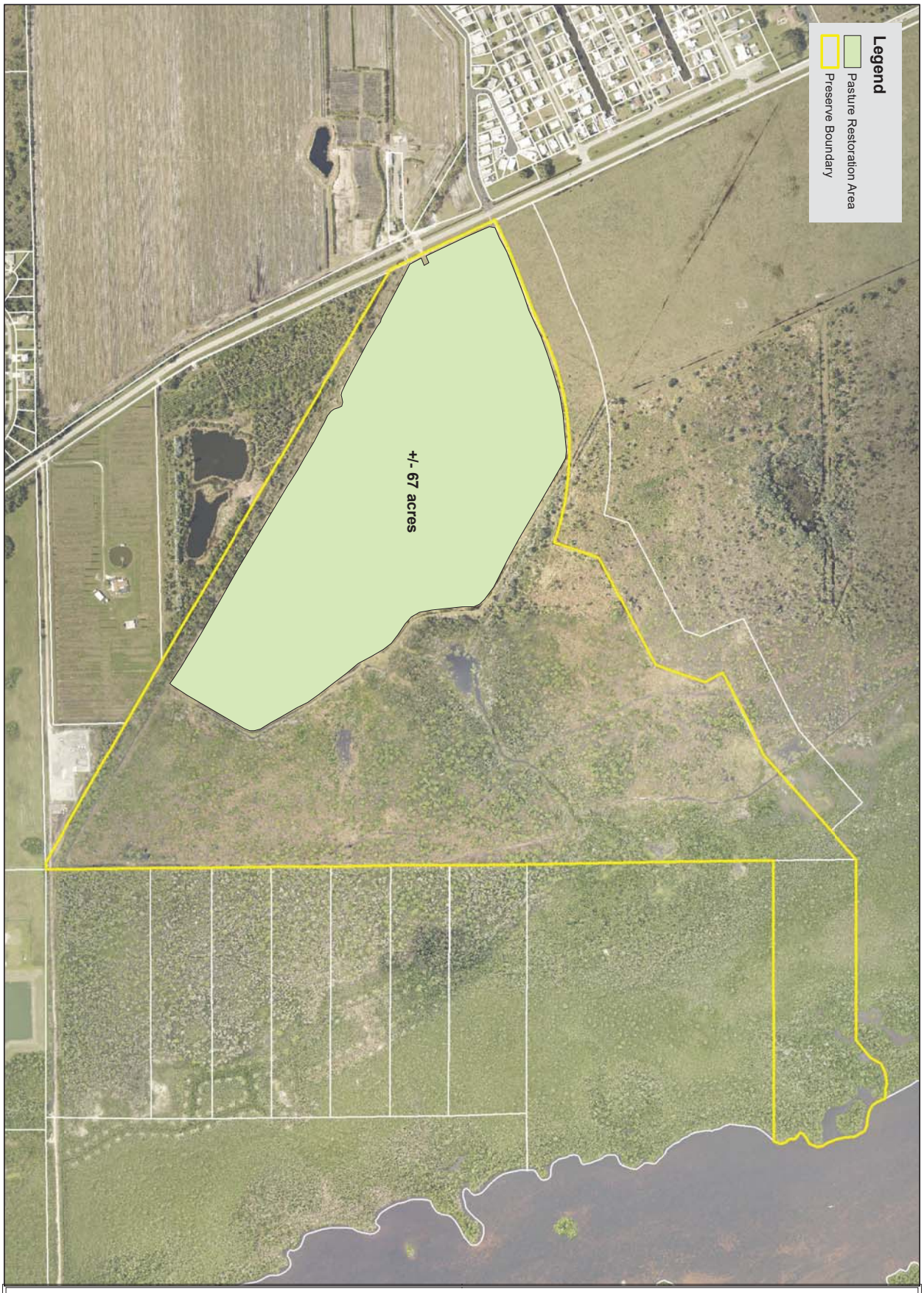


Figure 1A: Pasture Restoration Area

Data Sources: Lee Cty GIS 2016 Aerial & Parcel Bdy

1 inch = 500 feet

N

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kim@ecoplanz.com

Date: 29 Aug 2016

Last Revised:09 Sep 2016

Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\Fig1A_PastureRestorationArea_9Sep2016.mxd

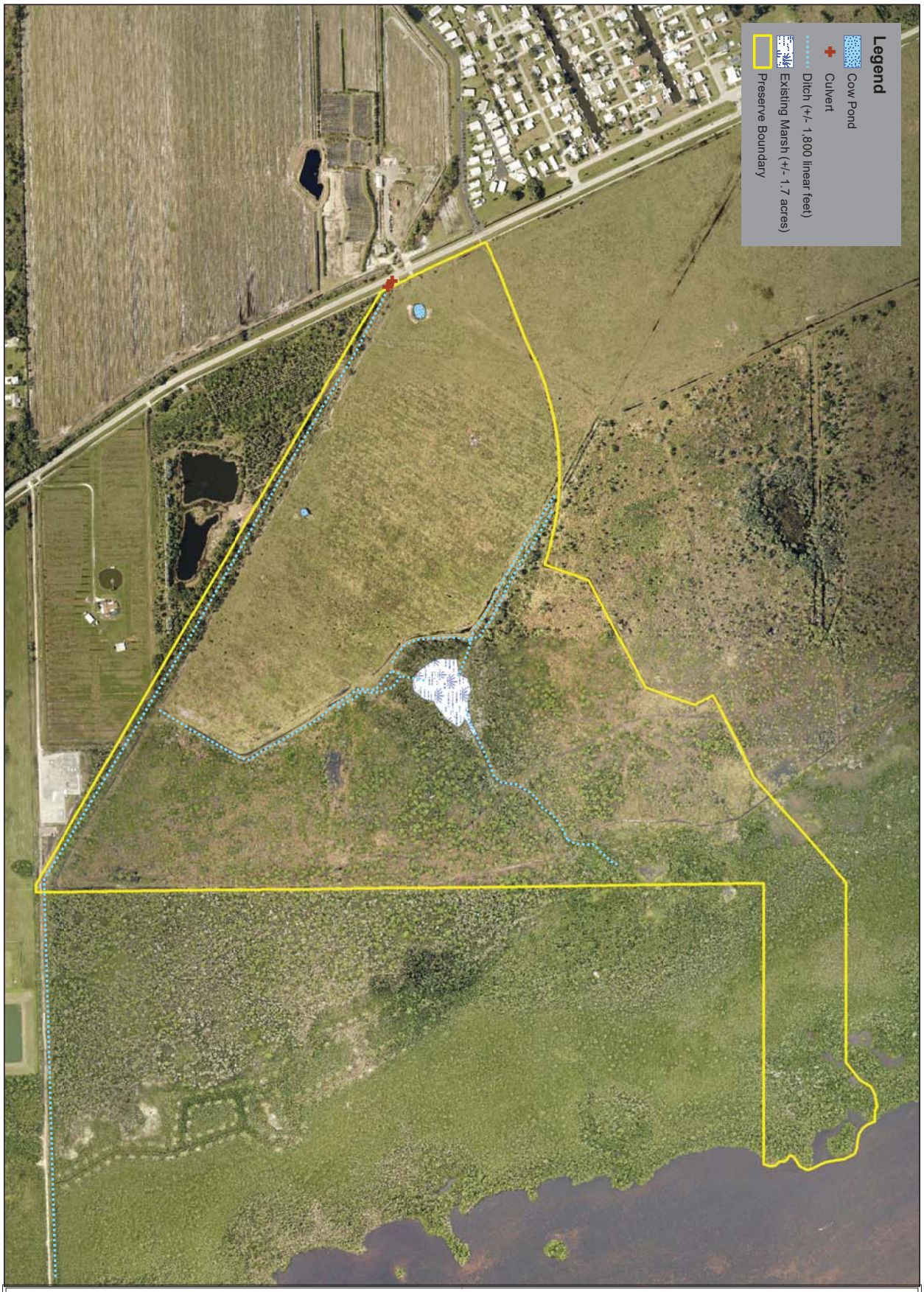

Figure 2A: Existing Ditch Network and Marsh

Data Sources: Lee Cty GIS 2016 Aerial & Parcel Bdy

1 inch = 500 feet

N

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Date: 29 Aug 2016

Last Revised: 09 Sep 2016

Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\Fig2A_Ditch-MarshMap_9Sep2016.mxd

Figure 3A: Target Plant Communities

1 inch = 300 feet

N

Data Sources: Lee City GIS 2016 Aerial & Parcel Bdy; GPS field waypts

Date: 18 Jul 2016

Last Revised: 09 Sep 2016

Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\Fig3A_TargetPlantCommunities_9Sep2016.mxd

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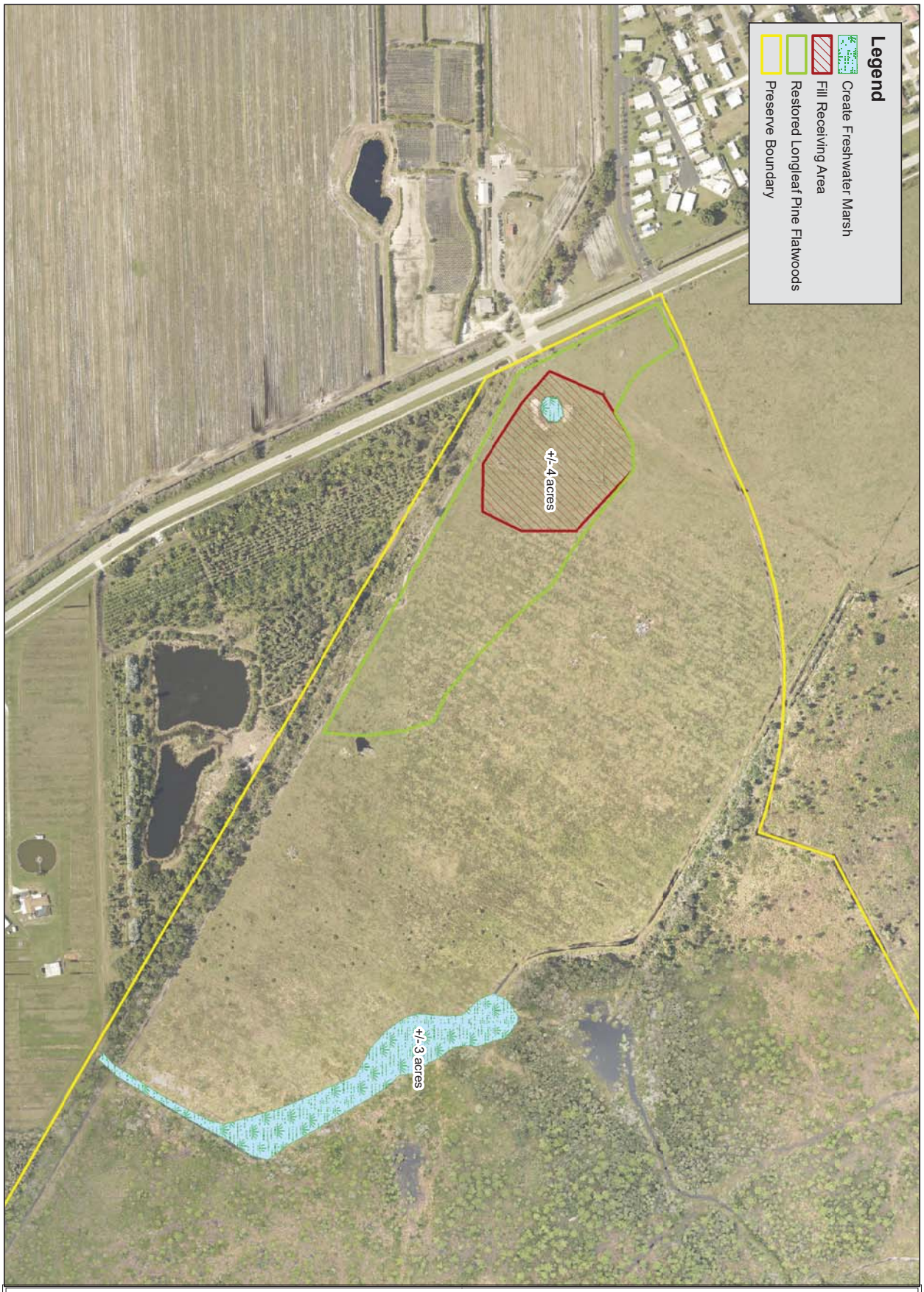

Figure 4A: Fill Receiving Area

Data Sources: Lee Cty GIS 2016 Aerial, Parcel Bdy, LiDAR; Fieldwork

1 inch = 300 feet

N

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kim@ecoplanz.com

Date: 29 Aug 2016
Last Revised: 09 Sep 2016

Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\Fig4A_Fill Receiving Area_9Sep2016.mxd

Pasture Analysis

Methodology: A field assessment was conducted from June through August 2016 to document the vegetation cover and identify issues to be addressed through the restoration plan. Fourteen vegetation transects (Figure 1B) were established to quantify the vegetation cover and dominate species. The point-line-intercept method was used to document the vegetation cover along each 300-linear foot vegetation transect. Photo-stations were established at the beginning of each transect for qualitative documentation of current conditions (Figure 2B). Additional qualitative analysis was obtained through observations during field work.

Point-Line-Intercept Results: Thirty-five (35) plant species were identified through the quantitative assessment. An average of three percent (3%) bare ground was documented. Invasive exotic vegetation average cover was three percent (3%) with a range of zero to nine percent (0-9%) within an individual transect.

The most prevalent species was bahia grass (*Paspalum notatum*) with an average cover of thirty-six percent (36%). The cover of bahia grass within individual transects ranged from three percent (3%) to seventy-two percent (72%).

Dog fennel (*Eupatorium capillifolium*) and ragweed (*Ambrosia* sp.) were the next two most frequent species detected at an average cover of thirteen (13%) and sixteen (16%) percent respectively. Dog fennel cover ranged from one to thirty-four percent (1-34%). Ragweed cover ranged from four to twenty-eight percent (4-28%).

Bermuda grass (*Cynodon dactylon*) was present with an average cover eight percent (8%); ranging from zero to sixteen percent cover (0-16%).

Flat-top goldenrod (*Euthamia minor*) occurred mainly in patches with an average cover five percent (5%); ranging from zero to twenty-one percent (0-21%).

The invasive exotic vegetation included three species: shrubby false buttonweed (*Spermacoce verticillata*; Category II) average cover two percent (2%); smutgrass (*Sporobolus indicus*; Category I) average cover less than one percent (0.3%); and tropical soda apple (*Solanum viarum*; Category I) average cover less than one percent (0.3%).

The point-line-intercept quantitative vegetation cover data is presented in Table 1B.

Table 1B: Point-Line-Intercept Data

Common Name	Scientific Name	Wetland Status (FL)	Category	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9	T-10	T-11	T-12	T-13	T-14
Bare ground	-	-	-	6	7	6	4	6	0	0	5	2	4	1	0	0	1
American burnweed (aka Fireweed)	*Erechtites hieracifolia*	-	Native	1	2	0	0	0	0	0	0	0	0	0	0	0	0
Annual kyllinga	*Cyperus sesquiflorus*	-	Native	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Asiatic pennywort	*Centella asciatica*	FACW	Introduced	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Bahia grass	*Paspalum notatum*	-	Introduced	24	3	18	6	20	34	40	31	49	56	52	60	52	72
Bermuda grass	*Cynodon dactylon*	-	Introduced	10	7	12	6	6	6	3	16	13	12	0	12	9	3
Broom grass	*Andropogon virginicus*	FAC	Native	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Bushy broom grass	*Andropogon glomeratus*	FACW	Native	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Bushy buttonweed	*Spermacoce assurgens*	-	Native	1	1	3	0	1	1	0	1	1	0	0	1	0	0
Clover (no flower)	*Trifolium* sp.	-	-	0	0	0	0	1	0	1	1	0	0	0	1	0	0
Common beggarticks	*Bidens alba*	FAC	Native	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Creeping beggarweed	*Desmodium incanum*	-	Introduced	4	2	9	8	11	8	2	3	0	0	2	0	0	0
Dayflower	*Commelina diffusa*	FACW	Native	0	0	1	0	0	0	3	0	0	0	0	2	0	0
Dog Fennel	*Eupatorium capillifolium*	-	Native	5	15	7	33	21	15	34	16	14	6	10	1	2	7
Flat-top goldenrod	*Euthamia minor*	-	Native	20	0	14	0	1	21	4	0	0	0	0	0	0	0
Frogfruit	*Phyla nodiflora*	FAC	Native	1	6	1	14	1	2	2	1	3	5	0	2	3	3
Grass - Undetermined broadleaf grass no seed or flower	Pomacea	-	-	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Herb - Undetermined no flower or seed		-	-	0	0	0	1	1	0	1	0	0	0	0	0	0	0
Bristly foxtail	*Setaria geniculata*	FAC	Native	0	0	0	0	1	0	0	0	0	0	0	0	4	0
Ragweed	*Ambrosia* sp.	-	Native/Introduced	22	28	22	26	16	5	5	17	6	10	22	17	17	4
Rattle-box	*Crotalaria lanceolata*	-	Introduced	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sabal palm	*Sabal palmetto*	FAC	Native	0	0	0	0	0	2	0	1	0	0	0	0	0	0
Saltbush	*Baccharis halimifolia*	FAC	Native	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Sedge	*Cyperus sp.*	-	Native/Introduced	1	0	1	0	2	1	0	0	0	0	0	0	0	1
Sedge - Globe sedge	*Cyperus ovularis*	-	Native	1	0	1	0	0	0	0	1	0	0	3	0	1	1
Sedge - Manyspiked flatsedge	*Cyperus polystachyos*	FACW	Native	0	0	0	0	0	1	0	0	2	0	0	0	0	4
Sedge - Poorland flatsedge	*Cyperus compressus*	FACW	Native	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sedge - Wiry flatsedge	*Cyperus filiformis*	-	Native	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Sedge - Swamp flatsedge	*Cyperus ligularis*	FACW	Native	0	13	3	0	0	1	0	0	0	0	0	0	0	0
Sedge - Tropical flatsedge	*Cyperus surinamensis*	FACW	Native	0	0	1	1	1	0	0	1	1	1	2	1	0	1
Shrubby false buttonweed	*Spermacoce verticullata*	-	Invasive Cat .II	1	1	0	0	8	0	1	2	3	3	5	2	5	1
Southern sida	*Sida acuta*	-	Native	0	1	1	0	0	2	0	0	1	1	2	1	0	0
Smooth Pigweed	*Amaranthus hybridus*	-	Introduced	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Smutgrass	*Sporobolus indicus*	-	Invasive Cat. I	0	3	0	0	0	0	0	0	0	0	1	0	0	0
Spurge	*Chamaesyce* sp.	-	Native	1	0	0	0	1	0	2	0	0	0	0	0	0	0
Tropical soda apple	*Solanum viarum*	-	Invasive Cat. I	0	0	0	0	0	1	0	3	0	0	0	0	0	0
Vaseygrass	*Paspalum urvillei*	FAC	Introduced	1	4	0	0	0	0	0	0	0	0	0	0	0	0
Water-primrose	*Ludwigia octovalvis*	OBL	Native	0	0	0	0	0	0	0	1	2	1	0	0	0	1
Wild bushbean	*Macroptilium lathyroides*	-	Introduced	0	0	0	1	0	0	0	0	3	1	0	0	5	1

Note: Invasive exotic category based upon Florida Exotic Pest Plant Council 2015 List; Native or Introduced category based upon Florida Dept of Environmental Protection Florida Wetland Plants manual or USDA Plant Database.

Qualitative Observations:

- The dog fennel and ragweed appear to provide enough shade to deter the sustained growth of pasture grasses.
- The gold-top ragweed is naturally recruiting in relatively large patches.
- The broomsedges are just beginning to grow and shoot flower heads.
- Cogongrass is present in large patches (Figure 3B). Some of the cogongrass has been treated, but other areas have no sign of being treated.
- Showy rattlebox (*Crotalaria spectabilis*) has grown mainly at the edges of the pasture with a large concentration on the south end of the pasture.
- Sedges, meadow beauty (*Rhexia* sp.), and other native herbaceous species are naturally recruiting throughout the pasture.
- The pasture grass cover decreases in the southern portion of the pasture.
- Sabal palms are naturally recruiting throughout the pasture with the largest palms in the southern portion of the pasture.
- Laurel oak and live oak are naturally recruiting in the southwest portion of the pasture. One laurel oak is greater than 10-feet in height.
- Sweet acacia (*Acacia farnesiana*) has naturally recruited in the southwest pasture with a few plants greater than 5-feet in height.
- Large Brazilian pepper (*Schinus terebinthifolius*) is present in scattered locations (Figure 3B).
- Earleaf acacia (*Acacia auriculiformis*) and melaleuca (*Melaleuca quinquenervia*) seedlings (3-6 feet) are growing near the edges of the pasture (Figure 3B).
- The pasture has been fallow (i.e. without cattle grazing) starting in July 2016.

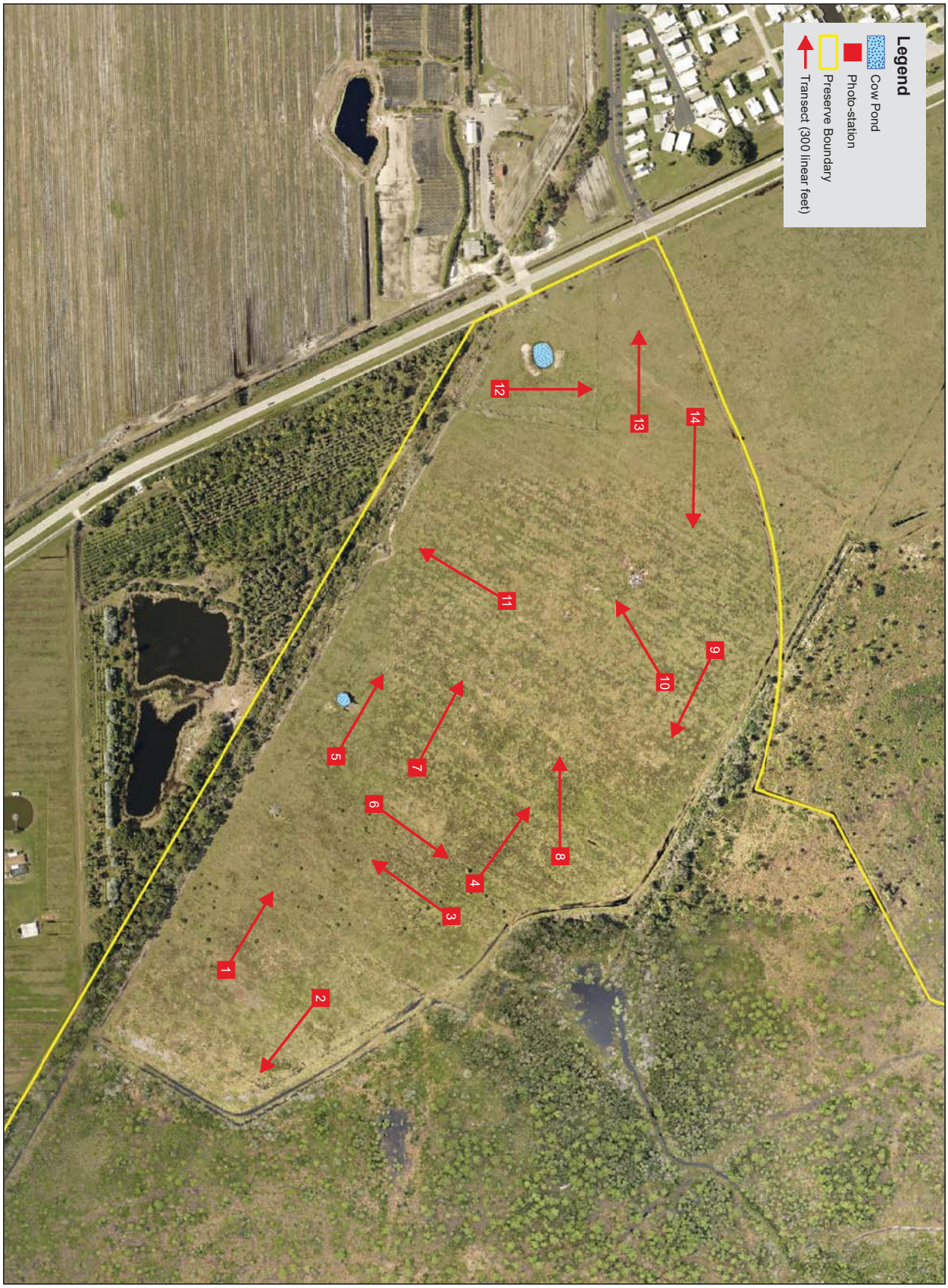

Figure 1B: Location of Transects

Data Sources: Lee Cty GIS 2016 Aerial & Parcel Bdy; GPS field waypts

1 inch = 300 feet

N

Date: 26 May 2016

Last Revised: 29 Aug 2016

Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\Transects_29Aug2016.mxd

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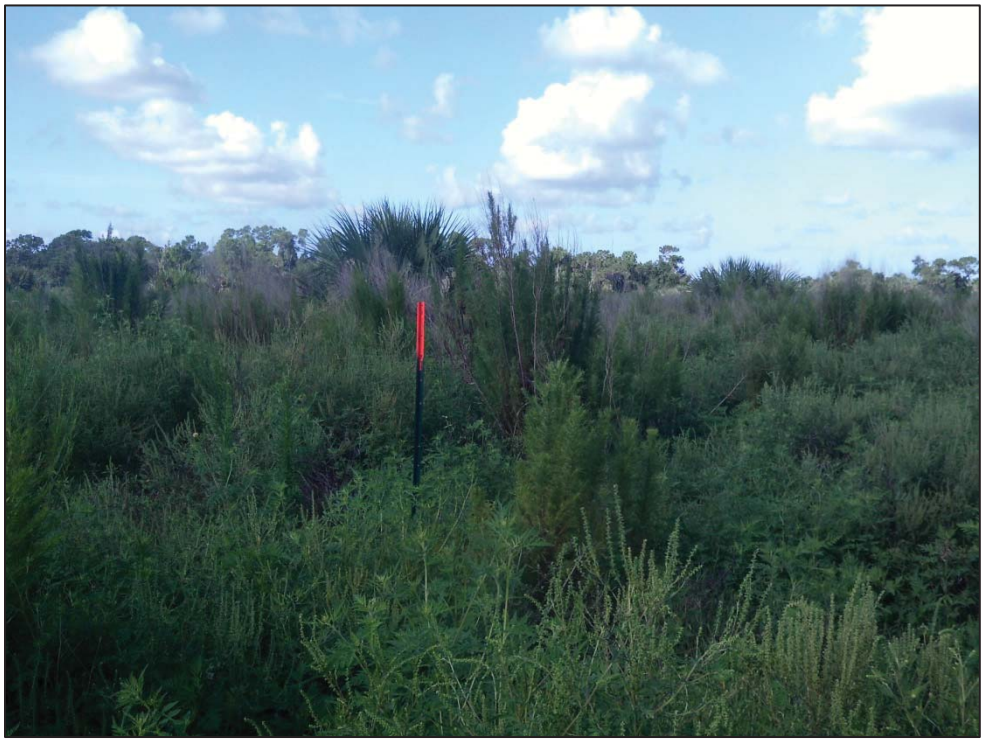
Figure 2B: Transect Baseline Photographs

T-1

T-2

T-3



T-4

T-5

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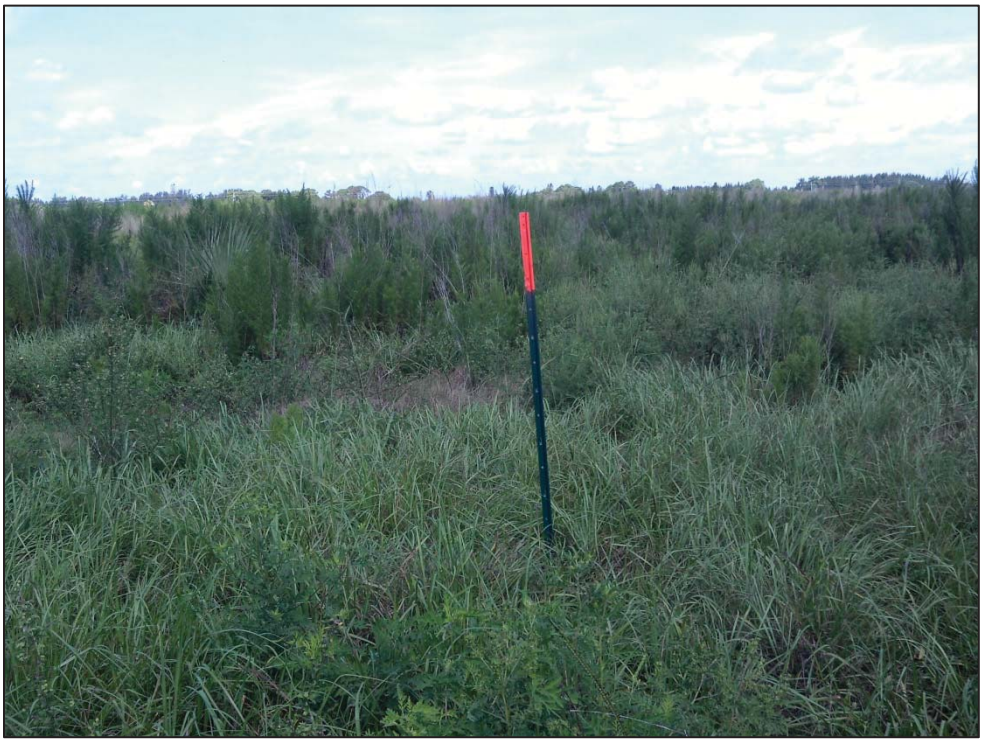
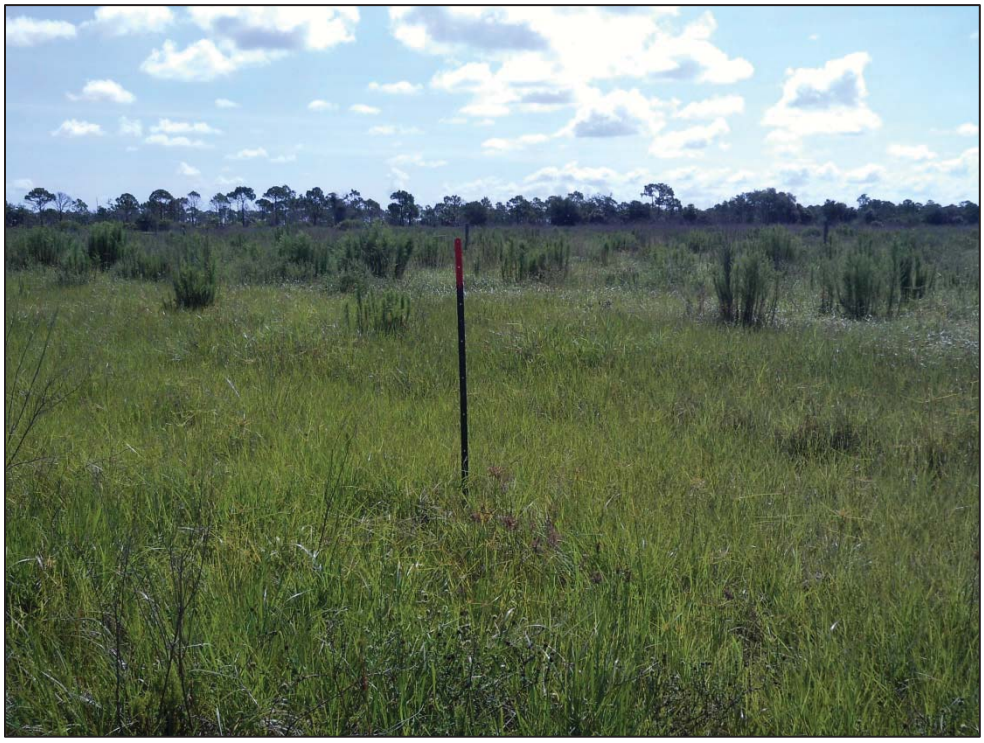


T-9

T-10

T-11

T-12



T-13

T-14

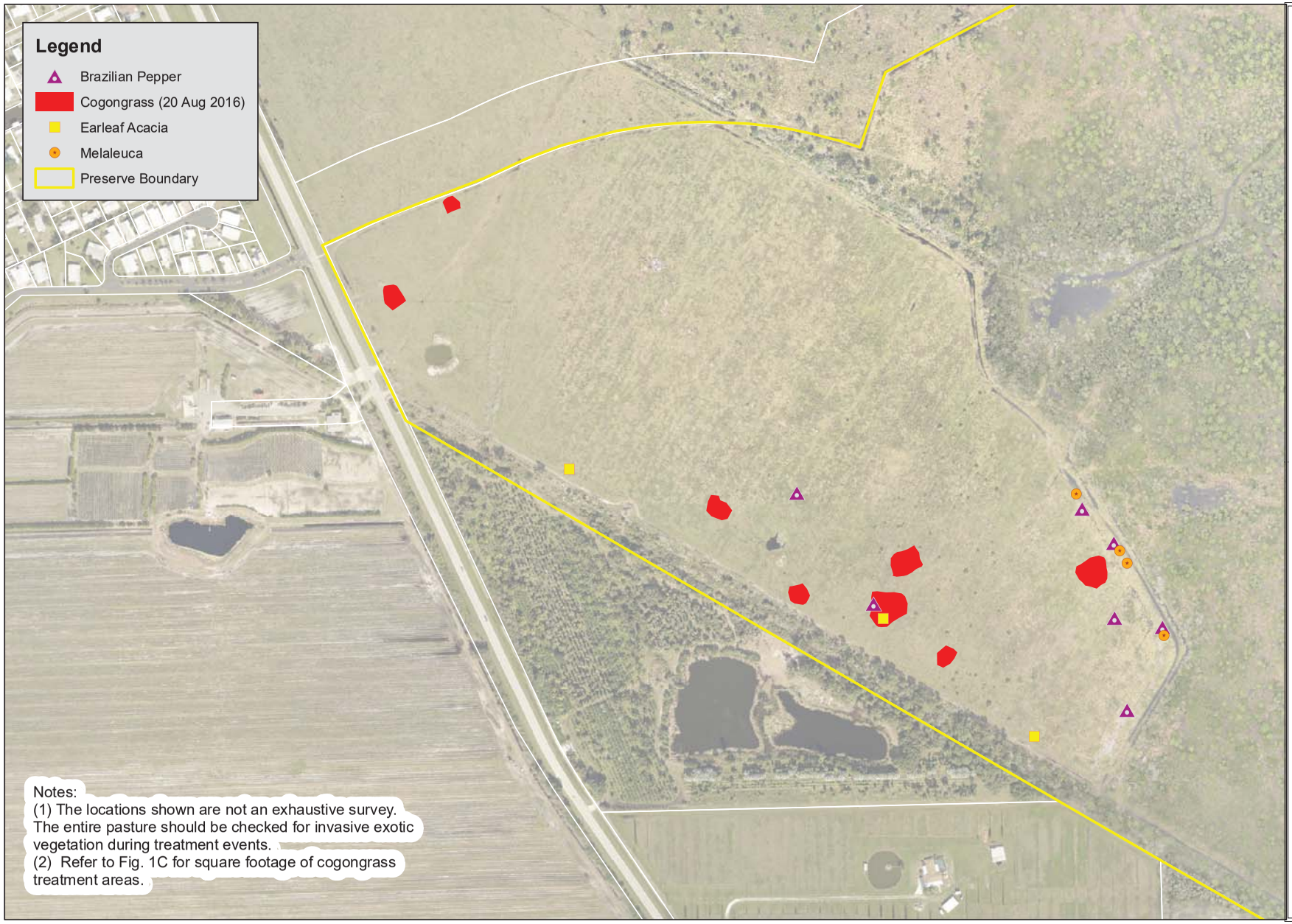


Figure 3B: Locations of Invasive Exotic Vegetation

Date: 29 Aug 2016
Last Revised: 09 Sep 2016
Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\Fig3B_LocInvasExVeg_9Sep2016.mxd

Data Sources: Lee Cty GIS 2016 Aerial & Parcel Bdy; GPS field waypts

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1 inch = 300 feet

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Site Preparation and Planting Plan

Overview: This section provides guidance for preparing the pasture and planting specifications. Invasive exotic vegetation management and methods to reduce pasture grass cover are presented. Planting plans for each of the target native vegetation communities are addressed, as well as, protection of natural recruits of appropriate native species.

Invasive Exotic Vegetation Management:

Plants listed on the Florida Exotic Pest Plant Council 2015 list as Invasive exotic vegetation are present within the pasture (Table 1C). Cogongrass occurs in large areas of coverage (Figure 1C). Spermacoce and tropical soda apple are found throughout the pasture. The melaleuca and earleaf acacia trees are seedlings less than 6-feet in height. Brazilian pepper occurs as individual plants at various locations. A recommended treatment schedule to prepare the site for planting is presented in Table 1C with further details under each species discussion below.

Table 1C: Invasive Exotic Vegetation

Common Name	Scientific Name	Recommended Treatment Schedule
Brazilian pepper	*Schinus terebinthifolius*	Foliar spray; Initial treatment with follow-up 1 month later
Cogongrass	*Imperata cylindrica*	Foliar spray; Minimum 2x per year for 2-3 years
Earleaf acacia	*Acacia auriculiformis*	Foliar or stump treatments; Initial treatment with follow-up 1 month later
Punk tree or Paper tree	*Melaleuca quinquenervia*	Foliar or stump treatments; Initial treatment with follow-up 1 month later
Shrubby false buttonweed	*Spermacoce vericillata*	To be determined
Tropical soda apple	*Solanum viarum*	Spot treatments; Foliar spray; Monthly Oct thru May

Color marker must be added to herbicide solution to insure all targeted species are treated and avoid double spraying. Each species should be treated separately with the appropriate herbicide for maximum kill. Do not use a mixture of herbicides that covers a combination of targeted species

Cogongrass: The patches of cogon grass (Figure 1C) will need to be treated in an aggressive manner to prevent expansion of coverage. A combination of herbicide, burning or mowing, mechanical disturbance of rhizomes, and planting of fast growing non-invasive, preferably native, plants. Burning the dead grass after a herbicide treatment will remove the biomass allowing for more effective follow-up herbicide treatments of sprouts. A summer burn is preferable. However, cogongrass burns hot

and the rhizomes are fire tolerant. If it is determined that burning the cogongrass is not feasible within this preserve, then the biomass of the dead grass should be reduced using a mulching mower or through mowing and careful removal of the cut grass. Prior to the follow-up herbicide treatment (i.e. 1 to 4 months after removing emergent biomass), the cogongrass areas should be mechanically disturbed to a depth of at least 6 inches to break up the rhizomes. The mechanical disturbance may be achieved with shovels in smaller areas, and with disking in larger areas. Any tools or equipment used within the cogongrass treatment areas must be carefully washed to prevent the inadvertent spread of cogongrass through the transportation of seed or rhizomes.

Herbicide treatments must be applied to cover all emergent vegetation and extend a minimum of 10-feet beyond the visible cogongrass. A 20-foot treatment area beyond the visible cogongrass is recommended for this project. Imazapyr and glyphosate are the most effective herbicides on cogongrass. These herbicides may be used separately or in combination. A surfactant should be added to the herbicide mixture. If imazapyr is used, then planting of the treated are should be scheduled a minimum of 24 months after the last treatment due to the residual soil activity. Glyphosate does not have the residual soil activity.

Brazilian Pepper, Earleaf Acacia and Melaleuca: Brazilian pepper, earleaf acacia, and melaleuca are present as individual plants or in small groups. There are a few large Brazilian pepper trees. The Earleaf acacia and melaleuca are present near the edge of the pasture as seedlings with a height of 3 to 6 feet. These plants should be treated either through foliar spray or stump treatments with a follow-up treatment a month after initial treatment.

Shrubby False Buttonweed: *Spermacoce verticillata* was added to invasive exotic plant list in 2015. Little information is available on the control and management of shrubby false buttonweed. Glyphosate has been found effective, but regrowth in 3 months was noted. A treatment plan for this species should be developed once more information detailing tested management practices is available, and after the native plant community restoration plan has been implemented for a minimum of 2 years to determine if this species is a problematic species on this particular site.

Tropical Soda Apple: Spot treatments are currently being used to control the tropical soda apple within the pasture. Regrowth has been observed on about fifty percent of the treated tropical soda apple. Spot treatments should continue with care taken to coat the entire plant with the herbicide. The recommended treatment schedule is

monthly from October through May to avoid the formation of fruit and to treat young plants. Seedlings generate from roots of existing plants and seeds. Roots may extend up to six feet from the plant. When a plant is located, sprouts should be looked for in a 6-foot radius of the plant.

Southern Pasture Management:

The southern edge of the pasture has dense growth of introduced and invasive exotic vegetation. In order to minimize the spreading of these "nuisance" species, this +/- 1.5 acre area (Figure 2C) should be mowed with a mulcher quarterly until planting to prevent seed formation and distribution.

Planting Trees:

Trees may be planted in advance of the introduction of shrubs and herbaceous species. This will allow the trees to gain height and canopy cover for at least six months, preferably 1-2 years. Mycorrhizal fungi should be placed in each of the pine planting holes prior to installing each tree to enhance root growth and tree health.

Pine trees may be planted beginning in October through December depending on the groundwater levels. The goal is to plant the pine seedlings while there is still moisture in the soil from the rainy season and the probability of rainfall before the driest months of the year. Pine growth is typically greatest outside the rainy season. The slash pine flatwoods restoration area (Figure 2C) should be mowed with a mulcher no more than 2 weeks prior to the planting. This will reduce the cover of dog fennel, ragweed, sabal palm seedlings, and other tall vegetation. The longleaf pine planting area does not need to be mowed prior to planting unless the dogfennel or ragweed cover increases.

Laurel oak and live oak trees may be planted in May through June. The goal is to utilize the rainy season combined with introduced mycorrhizal fungi to encourage the root growth prior to the onset of the first dry season following planting. The temperate hardwood creation area should be mowed with a mulcher no more than 2 weeks prior to the planting. Native trees, palms, and shrubs should be retained (i.e. not mulched) within this area.

Planting Plots for Shrubs and Herbaceous Vegetation:

Planting plots will be field located and marked with color coded survey stakes. These plots will a minimum 400 square feet and a maximum 10,000 square feet (# per target community to be determined).

The location of plots will be chosen to be where natural recruits are minimal. In areas with thirty percent (30%) or greater pasture grass cover, the planting plot will be prepared to reduce the competition from the pasture grasses. Methods for reducing pasture grass cover without the use of herbicide include: (1) removal with a sod harvesting machine; (2) mowing then covering with a tarp for 6-12 months to stress the pasture grass through elimination of sunlight and increased temperature; (3) mowing then covering with biodegradable weed barrier material to inhibit pasture grass growth; or (3) mowing then layering newspaper and/or cardboard. Whichever method is utilized, the planting plot will be cover with 4-6 inches of natural mulch before planting to increase survivability, enhance soil quality, and decrease regrowth of pasture grass.

The cogongrass treatment areas (Figure 2C) will become planting plots, but should be planted no earlier than 6 to 24 months after the final herbicide treatment depending on which herbicide is used. These areas may be prepared with the introduction of mycorrhizal fungi combined with biodegradable weed barrier and/or 6-8 inches of natural mulch to aid in the soil recovery from the intensive herbicide treatment.

Planting Specifications:

- Loosen soil with shovel or auger
- Add mycorrhizal fungi and water to planting hole
- Install plant then water thoroughly
- Place mulch a minimum of 12-inch diameter around 1-gallon or 3-gallon pots
- Place mulch a minimum of 6-inch diameter around bare root, 2-inch liner, or 4-inch pots
- Mulch to be placed at a minimum depth of 3-inches

Table 2C: Planting List by Target Community

Target Community	Common Name	Scientific Name	# Per Acre	# Per Plot	Container Size	Contract Grow	Seed
Dry Prairie	Lopsided Indiangrass	*Sorghastrum secundum*			1 gal		
	Tickseed	*Coreopsis floridana*			4 in - 1 gal		X
	Elliot's lovegrass	*Eragrostis elliottii*			4 in - 1 gal		
	Purple lovegrass	*Eragrostis spectabilis*			4 in - 1 gal		
	Florida sunflower	*Helianthus* spp.			4 in - 1 gal		X
	Blazing star	*Liatris*spp.			4 in - 1 gal		X
	Shiny blueberry	*Vaccinium mysinites*			1 gal		
	Paw paw	*Asimina* spp.			1 gal		
	Spiderwort	*Tradescantia ohiensis*			4 in - 1 gal		
	Butterfly-weed	*Asclepias tuberosa*			1 gal		
Longleaf pine flatwoods	Longleaf pine	*Pinus palustris*	50		BR - 3 gal	X	
	Tarflower	*Befaria racemosa*			1 gal	X	
	Coastalplain staggerbush	*Lyonia fruticosa*			1 gal	X	
	Rusty staggerbush	*Lyonia ferrunginea*					
	Wiregrass	*Aristida stricta*			BR	X	
	Saw palmetto	*Serenoa repens*			1 gal - 3 gal		
	Prickly pear cactus	*Opuntia humifusa*			BR - 1 gal		
	Gopher apple	*Licania michauxii*			4 in - 1 gal	X	
	Shiny blueberry	*Vaccinium myrsinites*			1 gal		
	Partridge pea	*Chamaecrista fasciculata*			1 gal	X	X
	Penny royal	*Piloblephis rigida*			4 in - 1 gal		
	Winged sumac	*Rhus copallina*			1 gal		
Slash pine flatwoods	South Florida slash pine	*Pinus elliottii densa*	50		BR - 3 gal	X	
	Saw palmetto	*Serenoa repens*	100		3 gal		
	Beautyberry	*Callicarpa americana*			1 gal		
	Gallberry	*Ilex glabra*			1 gal		
	Shiny lyonia/fetterbush	*Lyonia lucida*			1 gal	X	
	Wiregrass	*Aristida sticta*			BR - 1 gal	X	
	Gopher apple	*Licania michauxii*			BR - 1 gal	X	
	St. John's wort	*Hypericum* spp.			1 gal		X

Notes: BR = bare root Difficult to locate

Table 2C (continued): Planting List by Target Community

Target Community	Common Name	Scientific Name	# Per Acre	# Per Plot	Container Size	Contract Grow	Seed
Temperate Hardwoods	Live oak	*Quercus virginiana*	25		3 gal		
	Laurel oak	*Quercus laurifolia*	50		3 gal		
	Beautyberry	*Callicarpa americana*	10		1 gal		
	Coralbean	*Erythrina herbacaea*	10		1 gal		X
	Myrsine	*Myrsine guianensis*	25		1 gal		
	Wild coffee	*Psychotria nervosa*	10		1 gal		X
	Dahoon holly	*Ilex cassine*	10		1 gal - 3 gal		
Freshwater Marsh	Cord grass	*Spartina bakeri*			1-gal		
	Blue-flag iris	*Iris hexagona*			BR		
	Spider lily	*Hymenocallis* spp.			BR		
	Southern swamp lily	*Crinum americanum*			BR		
	Water hyssop	*Bacopa monnieri*			4-inch		
	Giant bullrush	*Schoenoplectus californicus*			BR		
	Jointed spikerush	*Elleochris intersticta*			BR		
	Coastal spikerush	*Elleochris cellulosa*			BR		
	Buttonbush	*Cephalanthus occidentalis*			1-gal		
	Yellow canna	*Canna flacida*			BR		

Notes: BR = bare root

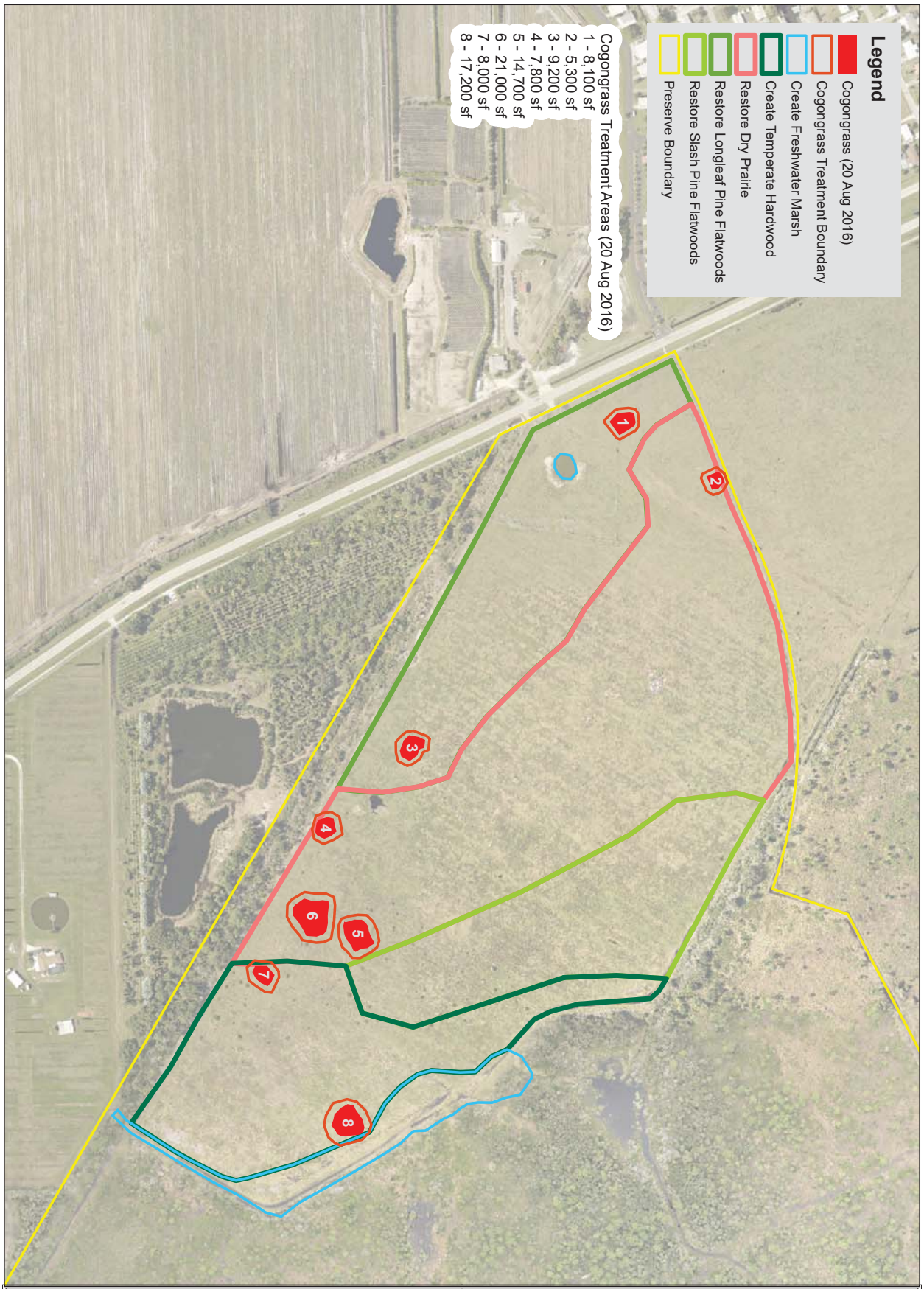

Figure 1C: Cogongrass Areas (20 August 2016)

Data Sources: Lee Cty GIS 2016 Aerial & Parcel Bdy; GPS field waypts

1 inch = 300 feet

N

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Date: 21 Aug 2016

Last Revised: 00 Month 2016

Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\RestorationPlan_Cogon Grass Map_211Aug2016.mxd

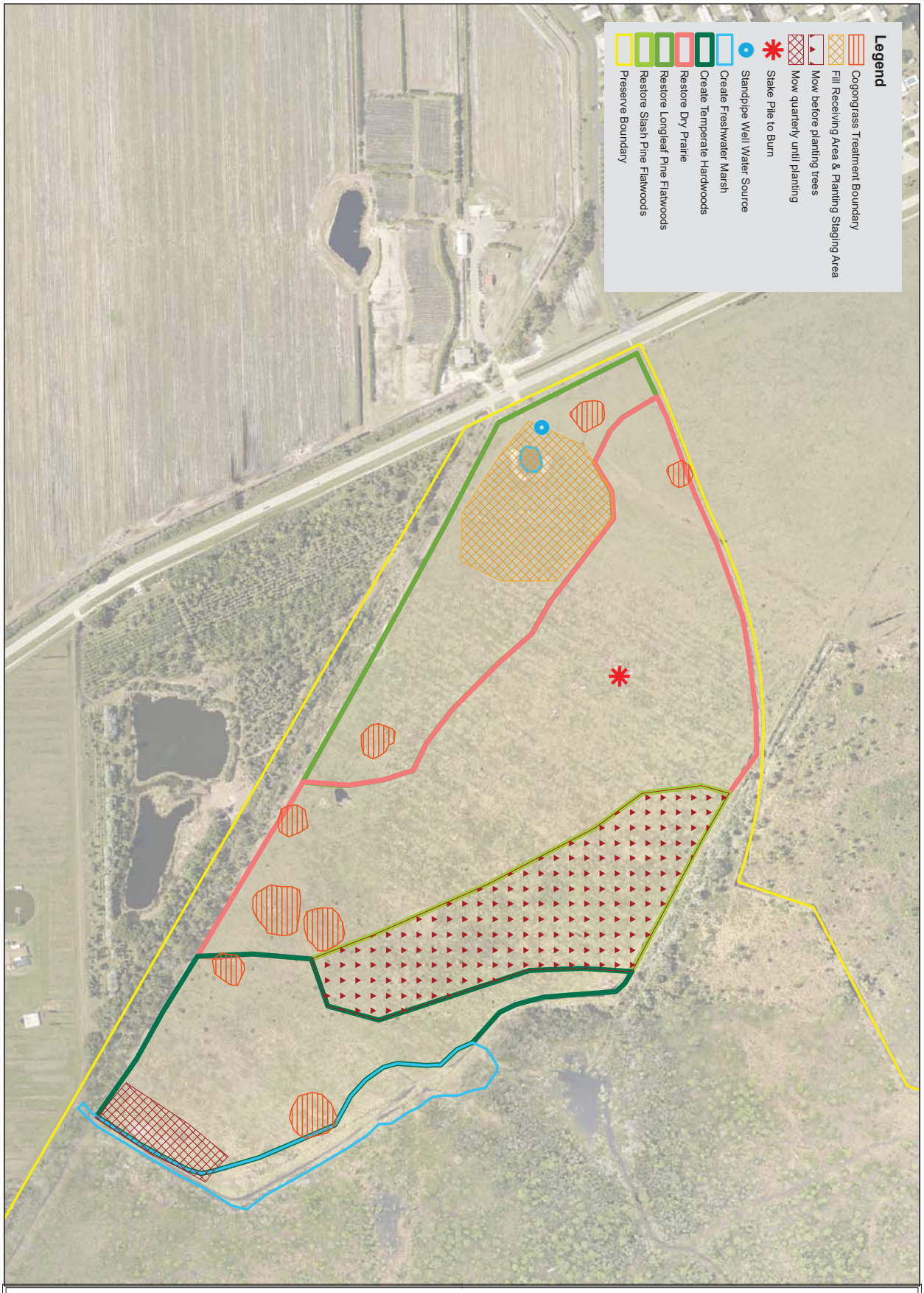

Figure 2C: Pre-planting Management

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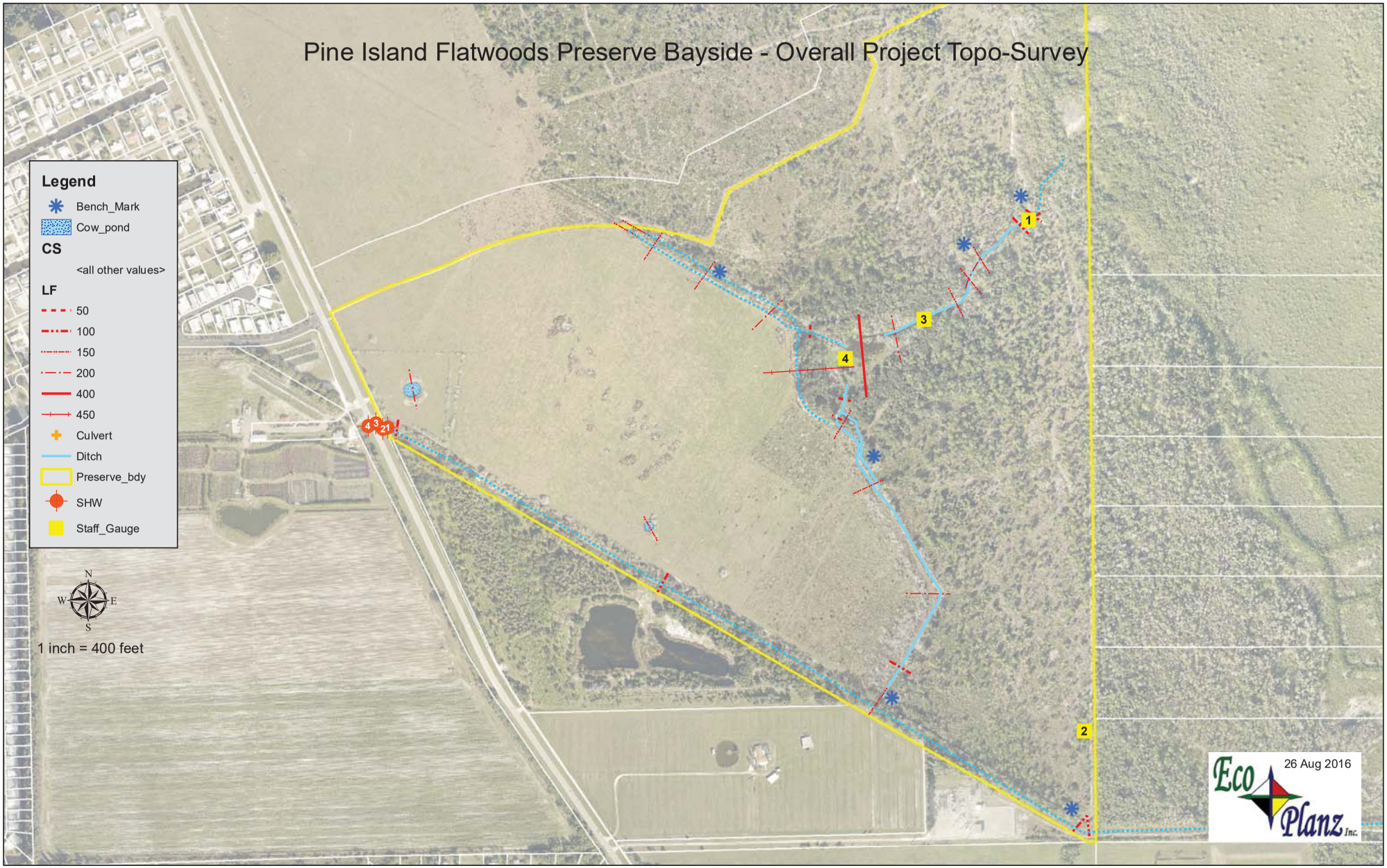
Data Sources: Lee Cty GIS 2016 Aerial & Parcel Bdy; GPS field waypts

Date: 31 Aug 2016
Last Revised: 09 Sep 2016

Document Path: I:\2014 Files\ArcGIS\Pine Id Flatwds Bayside\Fig2C_PreplantingMgt_9Sep2016.mxd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Bench_Mark
Cow_pond
CS
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LF
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100
150
200
400
450
Culvert
Ditch
Preserve_bdy
SHW
Staff_Gauge
N
W
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S
1 inch = 400 feet
1
2
3
4
4 3 2 1
26 Aug 2016
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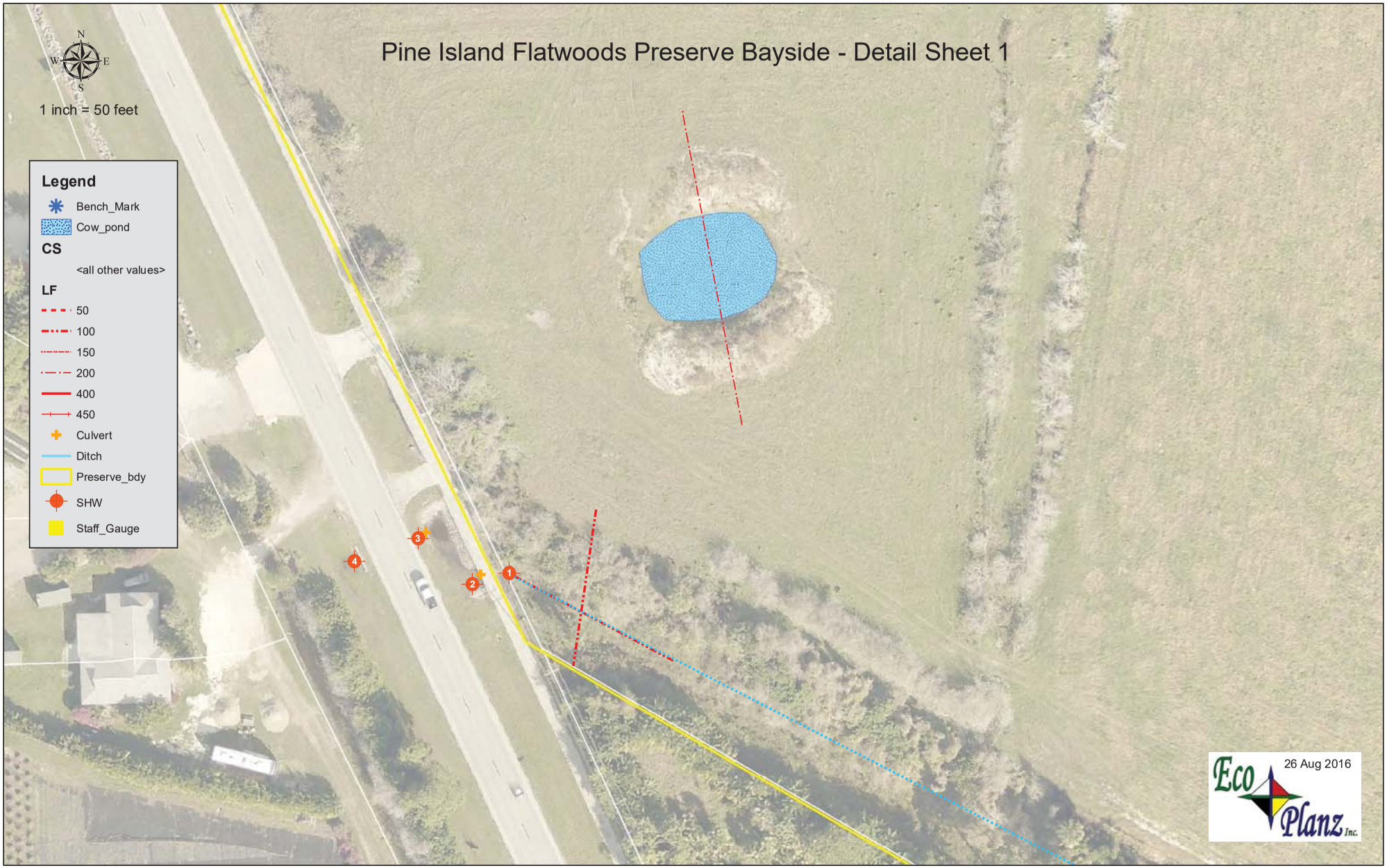
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E
S
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Legend
Bench_Mark
Cow_pond
CS
<all other values>
LF
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100
150
200
400
450
Culvert
Ditch
Preserve_bdy
SHW
Staff_Gauge
1
2
3
4
26 Aug 2016
Eco Planz Inc.


Pine Island Flatwoods Preserve Bayside - Detail Sheet 2
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W
E
S
1 inch = 100 feet
Legend
Bench_Mark
Cow_pond
CS
<all other values>
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50
100
150
200
400
450
Culvert
Ditch
Preserve_bdy
Staff_Gauge
SHW
1
3
4
26 Aug 2016
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Appendix I - Expended and Projected Costs and Funding Sources

Expended Costs 2006-2016

Natural Resource Management		
Item	Funding Source	Costs
Exotic Plant Treatments	Grants	$108,065.00
	C20/20 Management fund	$140,824.00
	C20/20 Volunteers and Staff	$3,984.00
Mechanical Brush Reduction	C20/20 Management fund	$191,117.00
Long leaf planting	C20/20 Management fund	$11,110.00
Pine tree thinning and Snag removal	C20/20 Management fund	$1,150.00
Palm grove restoration (planting)	C20/20 Management fund	$8,189.00
Gopher tortoise survey	C20/20 Management fund	$1,858.00
Prescribed Burning	C20/20 in-house	$23,000.00
Pump house/storage barn remodel/roadway i	C20/20 Management fund	$13,104.00
Wildfire Rehab	C20/20 Management fund	$4,835.00
Gopher tortoise habitat improvement	Grants	$10,538.00

Overall Protection		
Item	Funding Source	Costs
Fireline Installation	C20/20 Management fund	$89,159.00
Fencing Installation and repair	C20/20 Management fund	$73,668.00
Feral Hog Trapping	C20/20 Management fund	$140.00
Large Debris Removal	C20/20 in-house	$1,750.00
	C20/20 Management fund	$790.00
Management Plan (2 editions)	C20/20 in-house	$18,900.00
Preserve Identification Sign	C20/20	$2,400.00
Boundary signs	C20/20	$518

Total Natural Resource Management Cost	$517,774.00
Total Overall Protection Cost	$187,325.00
Pine Island Flatwoods Preserve Total Expended Cost	**$705,099.00**

Projected Costs 2016-2026

Natural Resource Management		
Item	Funding Source	Costs
Annual Costs		
Exotic Plant Treatments (In House)	C20/20	$540.00
Variable Costs		
Contracted Exotic Plant Treatments*	C20/20	$40,000.00
Prescribed Burns (In House)**	C20/20	$12,000.00
Contracted Pasture Restoration (Bayside)	C20/20	$200,000.00
Mechanical Brush Reduction (In House)***	C20/20	$31,508.00

Overall Protection		
Item	Funding Source	Costs
Annual Costs		
Fence Maintenance (In House)	C20/20	$1,500.00
Debris Removal (In House)	C20/20	$50.00
vandalism repairs	C20/20	$50.00
Fireline Maintenance (In House)	C20/20	$1,376.00
Fence replacement	C20/20	$10,000
Boundary sign replacement	C20/20	$50

Public Use		
Item	Funding Source	Costs
Annual Costs		
Trail marker/sign replacement	C20/20	$10
Trail Maintenance (In House)	C20/20	In House

Total Projected Annual Maintenance Cost Per Year	$13,576.00
Total Projected Variable Maintenance and Restoration Project Cost	$283,508.00
Pine Island Flatwoods Preserve Total Projected Cost Over 10 Years	**$297,084.00**

*Contracted exotic plant treats are scheduled on a 2 year rotation, total variable cost includes expense for 5 treatments in 10 years

**Prescribed burns projected on 3-4 year rotation, total variable cost includes expense for 3 burns in 10 years

***Mechanical brush reduction projected every 4 years, total variable cost includes expense for 2 treatments in 10 years